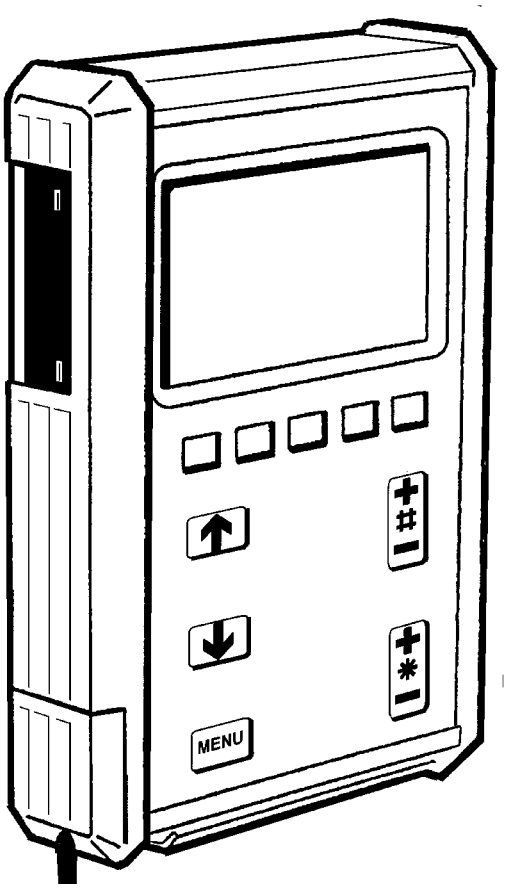
PUA 1



Programming manual

0456 685 174 **010815** **Valid for program version 3.00V, 3.01V, 3.02V, 3.03V**

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1 INTRODUCTION

ARISTO 2000 is one of the most practical welding power sources on the market. In order to get the maximum benefit from your welding equipment we recommend that you read this manual carefully.
You will find that there are many features to improve your work and make it easier.

All settings are made using the PUA 1 controller.

You will quickly find this very easy to use. To help you find the sections of the manual that are of special interest see the following:

Section 1: Introduction and basics
Sections 2–5: MIG/MAG, MMA, TIG and arc–air gouging, settings directly related to these parameters.
Sections 6–8: Measured value display, using the memory and quick settings.
Sections 9–10: Auxiliary functions and appendix.

See also the menu structure on the last page of this manual.

1.1 Main menu

ESAB LUD 450	
PROCESS:	MIG/MAG
METHOD:	DIP/SPRAY
WIRE TYPE:	Fe
SHIELDING GAS:	Ar+2O% CO2
WIRE DIMENSION:	1.2 mm
AUXILIARY FUNCTIONS	

SET	**MEASURE**	**MEMORY**	**FAST MODE**	**ENTER**

1.2 Using the controller

The controller can be said to consist of two units; **the working memory** and the **weld data memory**.

The working memory is used to store a complete set of welding parameters, which can then be saved in the weld data memory.

The welding process is always controlled by the contents of the working memory. This also makes it possible to download a set of welding parameters from the weld data memory to the working memory.

Note that the working memory always contains the last set of welding parameters that were used, in other words the working memory is never empty or “initialised“.

GB

1.3 Choice of language

The controller is programmed in up to four different languages, one of which is always English.

Controller 456 290-881	Controller 456 290-882	Controller 456 290-883
English	English	English
German	Swedish	Dutch
French	Finnish	Spanish
Italian	Danish	Portuguese

Controller 456 290-884	Controller 456 290-885
English	US English
Hungarian	Spanish
Polish	French
Czech	Portuguese

How to Choose the Language and Unit of length (Metric,Inch):

We start by pressing the MENU key to call up the main menu.

Using the arrow keys, move the cursor to the line AUXILIARY FUNCTIONS and press ENTER.

ESAB LUD 450

PROCESS: MIG/MAG
METHOD: DIP/SPRAY
WIRE TYPE: Fe
SHIELDING GAS: Ar+8%CO2
WIRE DIMENSION: 1.2 mm
AUXILIARY FUNCTIONS ▶

SET	MEASURE	MEMORY	FAST MODE	ENTER

Position the cursor on the line CONFIGURATION and press ENTER.

AUXILIARY FUNCTIONS

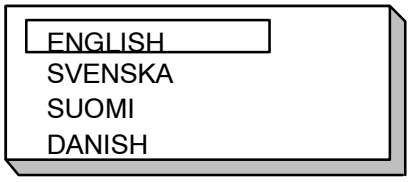
MEMORY CARDS OPERATIONS
CONFIGURATION
QUALITY FUNCTIONS
PRODUCTION STATISTICS
ERROR LOG
USER DEFINED SYNERGIC DATA
SERIAL COMMUNICATION
SOFTWARE UPGRADE

			QUIT	ENTER

Press ENTER to display the list of options.

AUXILIARY FUNCTIONS – CONFIGURATION				
LANGUAGE:		**SVENSKA**		
LOCK FUNCTION:		OFF		
REMOTE CONTROLS				
MIG/MAG DEFAULTS				
MMA DEFAULTS				
TIG DEFAULTS				
GENERAL DEFAULTS				
MULTIPLE WIRE FEEDERS				
UNIT OF LENGTH				
			QUIT	**ENTER**

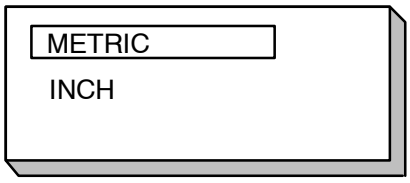
Position the cursor on the line for choice of language in the list and press ENTER.



Press ENTER to display the list of options.

AUXILIARY FUNCTIONS – CONFIGURATION				
LANGUAGE:		**SVENSKA**		
LOCK FUNCTION:		OFF		
REMOTE CONTROLS				
MIG/MAG DEFAULTS				
MMA DEFAULTS				
TIG DEFAULTS				
GENERAL DEFAULTS				
MULTIPLE WIRE FEEDERS				
UNIT OF LENGTH		**Inch**		
			QUIT	**ENTER**

Position the cursor on the line for choice of UNIT OF LENGTH in the list and press ENTER.



1.4 Display

ESAB LUD 450				
PROCESS:	**MIG/MAG**			
METHOD:	DIP/SPRAY			
WIRE TYPE:	Fe			
SHIELDING GAS:	Ar+2O%CO2			
WIRE DIMENSION:	1.2 mm			
AUXILIARY FUNCTIONS				
SET	**MEASURE**	**MEMORY**	**FAST MODE**	**ENTER**

Cursor

The cursor is shown in this manual as a box around the selected text. The controller cursor actually appears as a shaded field with the selected text highlighted in white.

Text boxes

At the bottom of the display are five boxes containing text that explains the current functions of the five keys in a line below them.

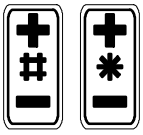
Saver mode

To extend the life of the display illumination it is switched off after three minutes if there is no activity.

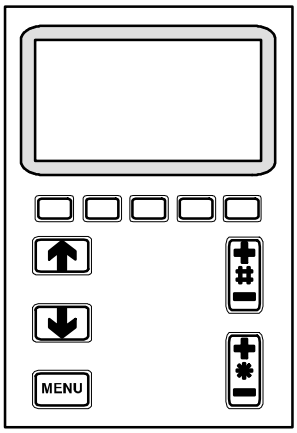
1.5 Keys

By using the cursor keys you can move the cursor to different lines in the display.

Pressing the menu key always brings you back to the main menu.

The plus/minus keys  are used to increase (+) or decrease (–) the value of a setting.
The two plus/minus keys are each marked with their own symbol. Most settings can be entered with either the plus or minus key, but certain settings must be made with the key marked ⌗ or the key marked ✱ (the symbols are visible in the display).

Pressing a key rapidly increases or decreases a setting in small steps. If the key is held down for longer the size of the steps increases.



Soft keys

The five keys in a row under the display have a variety of functions, these are “soft keys“, i.e. they can have different functions depending on which menu you are using. The current functions of these keys are shown by the text in the bottom line of the display (when a function is active this is shown by a white dot alongside the text).

CRATR FILL ●				

1.6 Settings in general

There are three main types of settings:

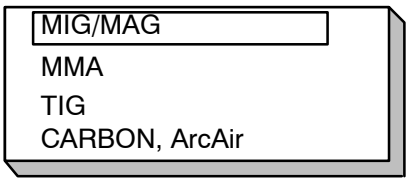
- Settings with numerical values
- Settings with fixed options
- Settings of the type ON/OFF or YES/NO

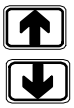
1.6.1 Numerical settings

To set a numerical value you use either the plus or minus key to increase or decrease the existing setting.

1.6.2 Settings with fixed options

Certain settings are made by selecting an alternative from a list. The list might look like this:



Here the cursor is positioned on the line for MIG/MAG. By pressing the ENTER key now you would select the MIG/MAG option.
If instead you wanted to choose another option then you would move the cursor to the chosen line by moving up or down using the cursor keys  . Then you press the ENTER key.
If you wanted to exit the list without making a selection you would simply press the QUIT key.

For some settings there are so many options that they cannot all be displayed at the same time. An arrow at the top or bottom of the list indicates that more options will become visible if you scroll up or down using the cursor keys.

1.6.3 ON/OFF or YES/NO settings

With certain functions you can switch the setting to ON or OFF, or to YES or NO. The synergic function in MIG/MAG and MMA welding is an example of such a function. ON/OFF or YES/NO settings can be selected in either of two ways:

You can select ON or OFF or YES or NO from a list of options as described above.

Or you can use the plus/minus keys to select ON/OFF or YES/NO.

- \+ (plus) = ON or YES
- – (minus) = OFF or NO

1.7 ENTER and QUIT

Both of the “soft“ keys at the bottom right are reserved for ENTER and QUIT.

- By pressing ENTER you confirm the selected option in a menu or list.
- By pressing QUIT you return to the previous menu or display.

2 MIG/MAG welding

2.1 The expression “wire“

In MIG/MAG welding you use an electrode that is wound on a reel (or drum). In this manual this type of electrode is always referred to as wire.

2.2 Synergic welding

Each combination of wire type, wire diameter and gas mixture requires its own unique combination of wire feed speed and voltage (arc length) in order to produce a stable arc. ARISTO 2000 has several pre-programmed “synergic lines“.
Once you have chosen the pre-programmed synergic line that matches your choice of wire type, wire diameter and gas mixture all you need to do is select a suitable wire feed speed for the welding job. The voltage (arc length) automatically follows the pre-programmed synergic line you have chosen, which makes it much easier to find the right welding parameters quickly.

In MIG/MAG welding there is an option to use the welding power source in synergic mode. This means that the user chooses a setting or value for:

- **method**
- **wire type**
- **shielding gas**
- **wire diameter**

On the basis of these **basic settings** and the selected value of **wire feed speed** a microprocessor then selects appropriate values for the various welding parameters. The values of these parameters are linked to the method you have chosen; **dip/spray** or **pulse**. See also “Weld data settings“ under section **2.4.**

It is also possible to weld with a combination of wire and shielding gas other than those offered by the controller. This could however mean that the user will have to set one or more parameters himself.

2.3 Basic settings

Basic settings are chosen from the controller’s main menu.

1. **Welding process = MIG/MAG**
2. **Welding method**

   In the case of MIG/MAG welding you can choose between two different welding methods.

   - Dip/spray
   - Short/Pulse
3. **Wire type, shielding gas, wire size**

   The following tables show the combinations of wire type, shielding gas and wire size that can be selected when the welding power source is in synergic mode.

GB

DIP/SPRAY		
Wire type	**Shielding gas**	**Wire diameter (mm)**
Low alloy or unalloyed wire (Fe)	CO_2	0,8 0,9 1,0 1,2 1,6
	Ar + 23% CO_2	0,8 1,0 1,2 1,6
	Ar + 25% CO_2	0,8 0,9 1,0 1,2 1,6
	Ar + 20% CO_2	0,8 0,9 1,0 1,2 1,6
	Ar + 15% CO_2 + 5%O_2	0,8 0,9 1,0 1,2 1,6
	Ar +16% CO_2	0,8 1,0 1,2 1,6
	Ar + 5%O_2+ 5% CO_2	0,8 1,0 1,2 1,6
	Ar + 8% CO_2	0,8 0,9 1,0 1,2 1,6
	Ar + 2% CO_2	0,8 1,0 1,2 1,6
	Ar + 2% O_2	0,8 0,9 1,0 1,2 1,6
Stainless solid wire (SS)	Ar + 2%O_2	0,8 1,0 1,2 (1,6*)
	Ar + 2% CO_2	0,8 0,9 1,0 1,2 (1,6*)
	Ar + 3%CO_2 + 1%H_2	0,8 0,9 1,0 1,2 1,6
	Ar + 30%He + 1%O_2	0,8 1,0 1,2 (1,6*)
	Ar + 32%He + 3%CO_2 + 1% H_2	0,8 0,9 1,0 1,2 (1,6*)
Stainless duplex wire (Ss duplex)	Ar + 2% O_2	1,0
	Ar +30% He +1%O_2	1,0
Magnesium-alloyed aluminium wire (AlMg)	Ar	0,9 1,0 1,2 1,6
Silicon-alloyed aluminium wire (Al-Si)	Ar	0,9 1,0 1,2 1,6
	Ar + 50% He	0,9 1,0 1,2 1,6
Metal powder cored wire (Fe)10	Ar + 20% CO_2	1,0 1,2 1,4 1,6
	Ar+ 8% CO_2	1,0 1,2 1,4 1,6
Rutile flux cored wire (Fe)	CO_2	1,2 1,4 1,6
	Ar + 20% CO_2	1,2 1,4 1,6
Basic flux cored wire (Fe)	CO_2	1,0 1,2 1,4 1,6
	Ar + 20% CO_2	1,0 1,2 1,4 1,6
Stainless flux cored wire (SS)	Ar + 20% CO_2	1,2
	Ar + 8% CO_2	1,2
	SELF SHIELDED	1,6 2,4
Duplex rutile flux cored wire SS	Ar + 20% CO_2	1,2
Metal powder cored stainless wire	Ar + 2% O_2	1,2
	Ar +2% CO_2	1,2
	Ar +8% CO_2	1,2
	Ar + 20% CO_2	1,2
Nickel base	Ar + 50% He	0,9

*) LUD 450

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PULSE		
Wire type	**Shielding gas**	**Wire diameter (mm)**
Low alloy or unalloyed wire (Fe)	Ar + CO_2	0,8 1,0 1,2 1,6
	Ar + 25% CO_2	0,9
	Ar + 20% CO_2	0,8 0,9 1,0 1,2 (1,6*)
	Ar + 23% CO_2	0,8 1,0 1,2 (1,6*)
	Ar +16% CO_2	0,8 1,0 1,2 (1,6*)
	Ar + 5%O_2+ 5% CO_2	0,8 0,9 1,0 1,2 (1,6*)
	Ar + 8% CO_2	0,8 0,9 1,0 1,2 (1,6*)
	Ar + 2% CO_2	0,8 1,0 1,2 (1,6*)
	Ar + 2% O_2	0,8 0,9 1,0 1,2 (1,6*)
Stainless wire (SS)	Ar + 2%O_2	0,8 1,0 1,2 1,6
	Ar + 2% CO_2	0,8 0,9 1,0 1,2 1,6
	Ar + 30%He + 1%O_2	0,8 1,0 1,2 1,6
	Ar +3% CO_2 + 1%H_2	0,8 1,0 1,2 1,6
	Ar + 32%He + 3%CO_2 + 1% H_2	0,8 1,0 1,2 1,6
Stainless duplex wire (SS Duplex)	Ar + 30%He +1%O_2	1,0
	Ar + 2% O_2	1,0
Magnesium-alloyed aluminium wire (AlMg)	Ar	0,8 0,9 1,0 1,2 1,6
Silicon-alloyed aluminium wire (Al-Si)	Ar	0,9 1,0 1,2 1,6
	Ar + 50% He	0,9 1,0 1,2 1,6
Metal powder cored wire (Fe)	Ar + 20% CO_2	1,0 1,2 1,4 1,6
	Ar + 8% CO_2	1,2 1,2 1,4 1,6
Metal powder cored stainless wire (SS)	Ar + 2% O_2	1,2
	Ar +2% CO_2	1,2
	Ar +8% CO_2	1,2
Nickel alloy wire	Ar	0,9 1,0 1,2
(Nickel base)	Ar + 50% He	0,9 1,0 1,2

*) LUD 450

2.4 Welding data settings

The following is an summary of the welding parameters that affect the welding process when using MIG and MAG welding methods.

With the power source in synergic mode it is only necessary to set the **wire feed speed**.
The **voltage** parameter may also be adjusted if required.

When the wire feed speed is adjusted the synergic control system automatically adjusts certain other parameters to compensate. The parameters in italics remain constant and are unaffected by changes in the wire feed speed.

Method DIP/SPRAY

- Wire feed speed
- Voltage
- *Inductance*
- *Control type*

Method PULSING

- Wire feed speed
- Voltage
- Pulse current
- *Pulse time*
- Pulse frequency
- Background current
- *Ka*
- *Ki*

A table of parameter setting ranges is given in the APPENDIX see step **10.**

2.5 Start and stop settings

The following settings affect the start and stop cycle during MIG/MAG welding. All the settings that affect the start/stop cycle and the way welding finishes are described under the following headings.

Start settings

- Gas pre-flow
- Creep start
- Hot start
  - Hot start time
  - Increase wire feed speed (2 m/min unless stated otherwise)
  - Increase voltage (only when not in synergic mode)

Stop settings

- Gas post-flow
- Burnback time
- Shake-off pulse (only for DIP/SPRAY when not in synergic mode)
- Crater fill
  - Crater fill time
  - Final wire feed speed
  - Final voltage (only when not in synergic mode)

There are three different functions that are designed to meet special requirements at the start and end of welding. These functions and auxiliary settings are made in the start data menu and stop data menu.

Hot start

Hot start should be selected if you want a hotter arc at the start of the welding cycle to prevent welding defects at the start of the weld.

Crater fill

The crater fill function makes it easier to avoid porosity, hot cracks and crater cracking in the weld when you stop welding.

Creep start

The creep start function gives a lower wire feed speed and is suitable to use when wanting to obtain the best possible start. The creep start speed is 50% of the set wire feed speed. The function is activated on delivery.

TIP! The hot start, creep start and crater fill functions can be switched on or off using the “soft keys“, see the section on “MIG/MAG configuration“ see step **9.2.4.2.**

The start data and stop data menus are used to set the values for the following parameters.

Gas pre- and post-flow

The parameters gas pre-flow and gas post-flow specify the length of time that the gas continues to flow before and after welding.

Burnback time

Burn-back time is used to adjust the electrode stick-out at the end of welding.

2.6 Gas purge, cold wire feed and trigger latch

Like hot start and the others the following three functions can be controlled using the soft keys. To find out how to do this see “MIG/MAG configuration“ see step **9.2.4.2.**

Gas purge

The gas purge function is used to fill the gas hoses with shielding gas, or in order to measure the gas flow rate. The gas flows when you press the key and stops when you release it.

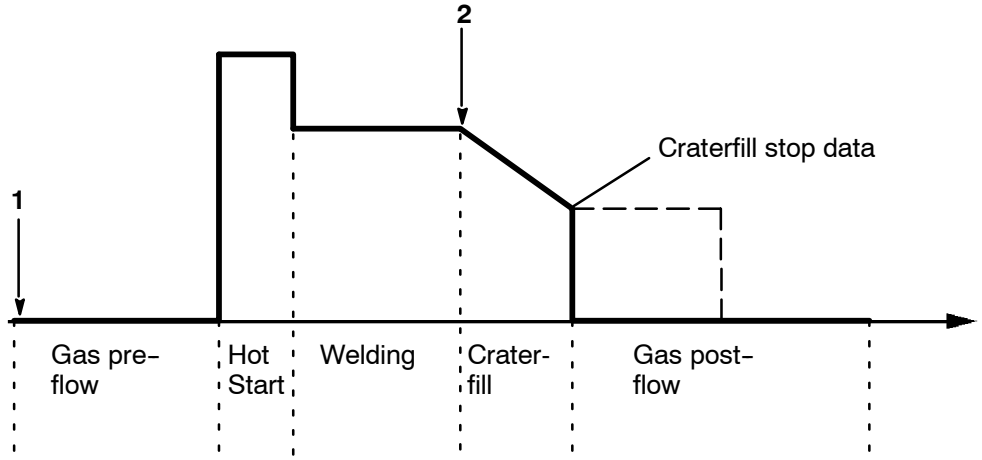
Cold wire feed

This function is used to feed wire out manually when fitting a new reel of wire. When the key is pressed the wire is fed forward, and when it is released the wire stops.

Gun trigger mode

In MIG/MAG welding the torch switch can operate in two ways; with trigger latch off or trigger latch on. Trigger latch off/on can be assigned to one of the soft keys.
The difference between having the trigger latch off or on is illustrated in the following diagrams, together with other functions in the start/stop cycle.

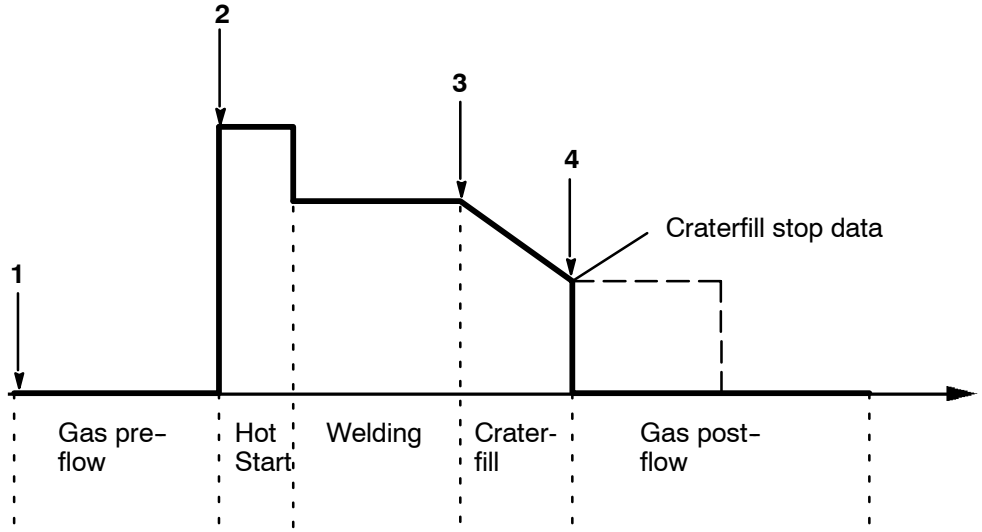
Trigger latch off (2-Stroke)



With the trigger latch off the gas pre-flow (if set) begins when the gun trigger is pressed (1). The welding parameters then rise to their set values or (if set) Hot start values.
When the gun trigger is released (2) the crater fill period begins. After this has elapsed the welding parameters drop to back zero and the gas post-flow (if set) finishes the welding sequence.

TIP! If the gun trigger is pressed in again during the crater fill period then you can continue welding using the final crater fill parameters for as long as required (dotted line). Crater fill can also be cut short by pressing and releasing the gun trigger quickly during the crater fill period.

Trigger latch on (4-Stroke)



When the trigger latch is on the gas pre-flow begins when the gun trigger is pressed (1). When the trigger latch is released (2) the welding parameters rise to their set values. When the gun trigger is pressed again (3) the crater fill period begins. When this has elapsed the values of the welding parameters drop to stop data.
The gas post-flow period begins when the gun trigger is released (4).

TIP! Crater fill stops when the gun trigger is released (4). If instead the trigger is held in for longer then you can continue welding using the final crater fill parameters (dotted line).

2.7 MIG/MAG configuration

See step **9.2.4.**

2.8 Setting-up example MIG/MAG

The following is an example of how to set up the controller for MIG/MAG welding using dip/spray transfer. Setting up for pulse welding is done in a similar way. The example assumes that the power source is in synergic mode.

2.8.1 Basic settings

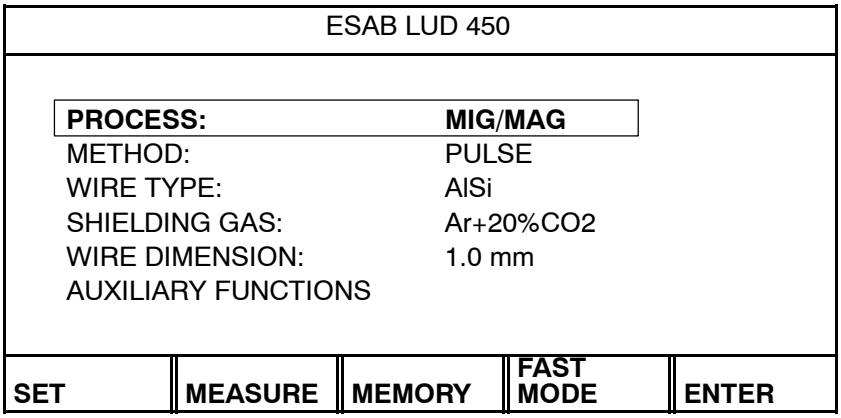
You use the main menu to make settings such as wire, method and material type.

We start by pressing the MENU key to call up the main menu.
We will make the following five settings:

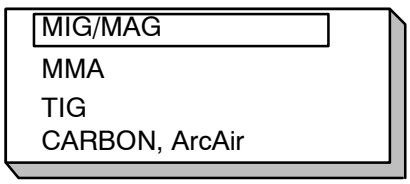
- PROCESS = MIG/MAG
- METHOD = DIP/SPRAY
- WIRE TYPE = Fe
- SHIELDING GAS = Ar+8%CO2
- WIRE DIAMETER = 1.2 mm

Process

The first setting is the type of welding process. Use the arrow keys to select the line for PROCESS. Press ENTER to display the list of options.



Position the cursor on the line for MIG/MAG in the list and press ENTER again. Now we have set PROCESS = MIG/MAG.



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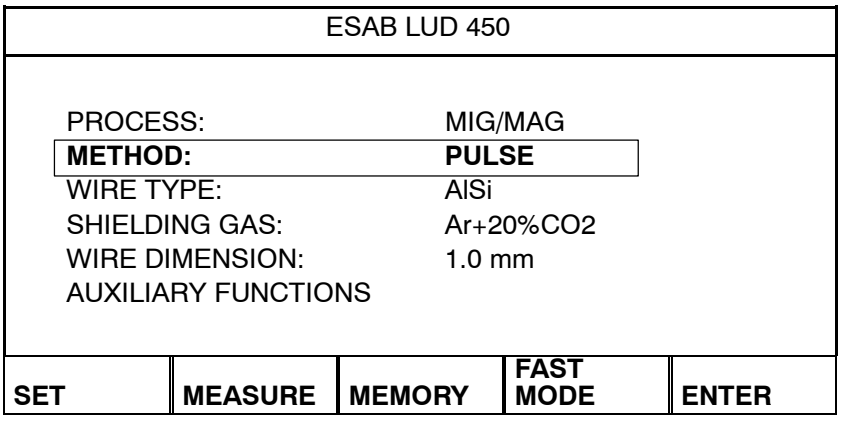
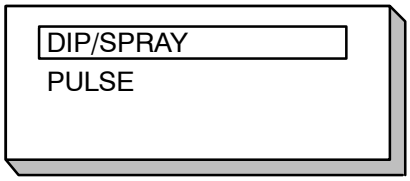
Method

Position the cursor on the line for METHOD. Press ENTER to display the list of options.

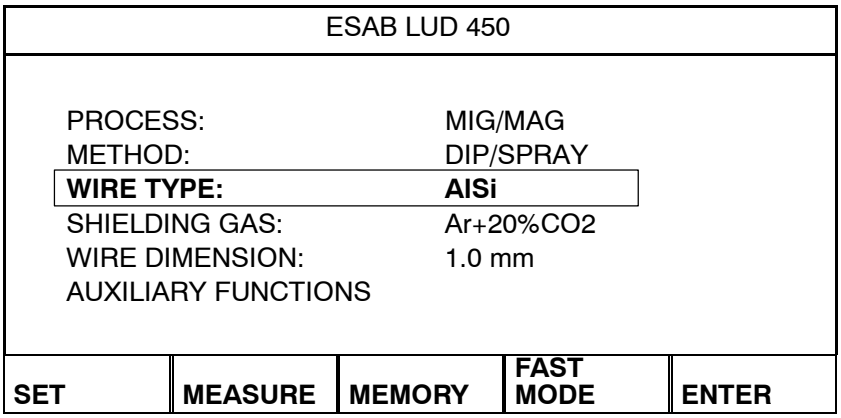


Position the cursor on the line for DIP/SPRAY in the list and press ENTER. We have now set the METHOD = DIP/SPRAY.



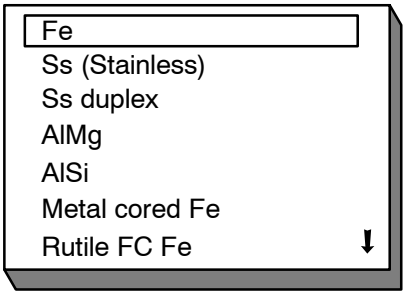
Wire type

Position the cursor on the line for WIRE TYPE. Press ENTER to display the list of options.



Here is an example of a list that has so many options that they cannot all be displayed at the same time. The arrow in the bottom right cordown of the list indicates that more options will become visible as you scroll down the list.

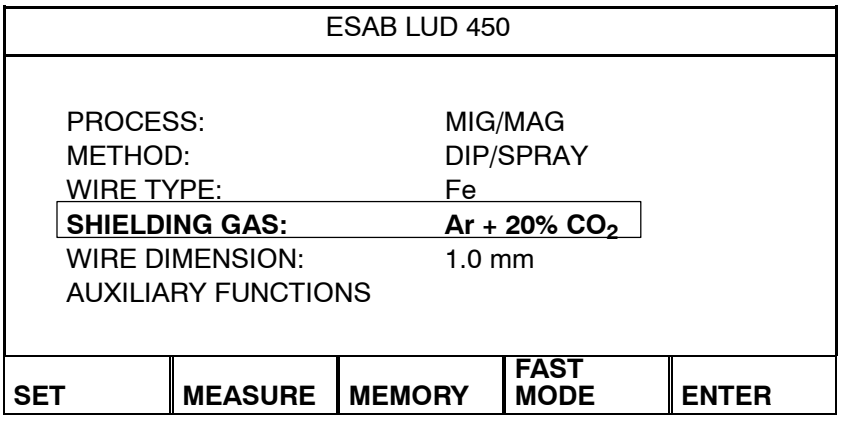
Now position the cursor on the line for Fe and press ENTER.
We have now set the WIRE TYPE = Fe.



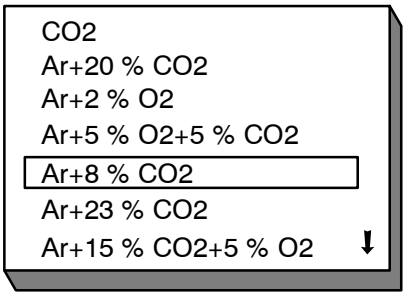
GB

Shielding gas

Position the cursor on the line for SHIELDING GAS. Press ENTER to display the list of options.

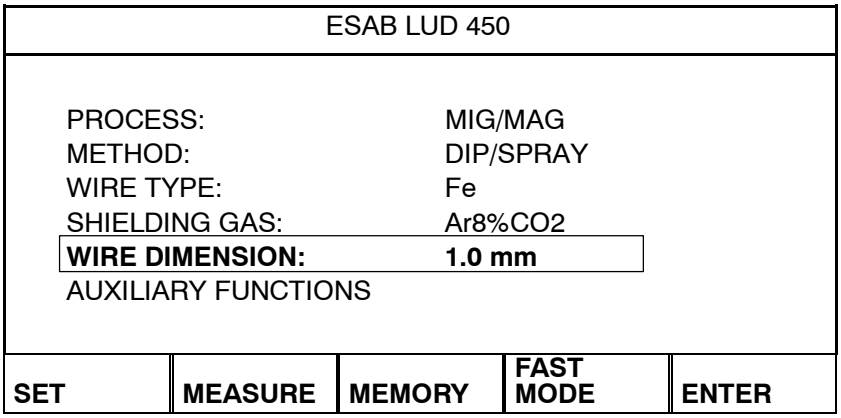


Position the cursor on the line for Ar+8%CO2 and press ENTER. We have now set the SHIELDING GAS = Ar+8%CO2.

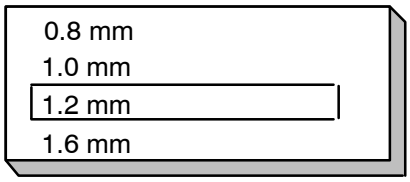


Wire dimension

Position the cursor on the line for WIRE DIMENSION. Press ENTER to display the list of options.



Position the cursor on the line for 1.2 mm and press ENTER. We have now set the WIRE DIMENSION = 1.2 mm.



The next line in the main menu is AUXILIARY FUNCTIONS. You can read more about these functions in the section “AUXILIARY FUNCTIONS“ see step **9.**

ESAB LUD 450				
PROCESS: MIG/MAG METHOD: DIP/SPRAY WIRE TYPE: Fe SHIELDING GAS: Ar8%CO2 WIRE DIMENSION: 1.2 mm **AUXILIARY FUNCTIONS ▶**				
SET	**MEASURE**	**MEMORY**	**FAST MODE**	**ENTER**

2.8.2 Weld data settings

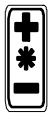
You can use the settings menu to set the values of various welding parameters, such as voltage and wire feed speed. If you switch to synergic mode the microprocessor will take care of several of these settings.

To start, we call up the main menu by pressing the MENU key. Then select the settings menu by pressing the SET key. We will now make the following settings:

- WIRE FEED SPEED = 10.0 m/min

Wire feed speed

Position the cursor on the line WIRE SPEED. Set it to 10.0 m/min using:



WELD DATA SETTING				
VOLTAGE: **# 29.0 (+0.0) V** WIRE SPEED: *** 10.0 m/min** INDUCTANCE: 85 % SYNERGIC MODE ON START DATA . . . STOP DATA				
CRATR FILL	**HOT START**	**4-STROKE**	**QUIT**	

In the settings menu you can now also see the values that the microprocessor has chosen for voltage and inductance.

The **voltage** parameter may also be adjusted if required.

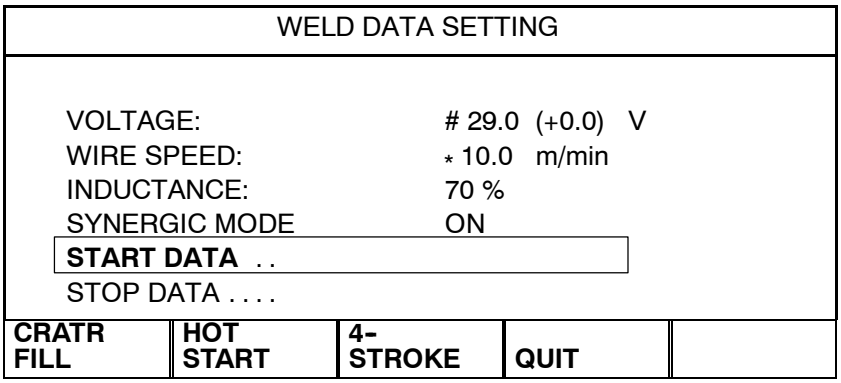
2.8.3 Start data settings

Using the start data menu you can adjust the settings that affect the starting sequence during MIG/MAG welding. We will set the following:

- GAS PRE-FLOW = 0.8 s
- CREEP START = YES
- HOT START = YES
- HOT START time = 1.0 s
- HOT START wire feed speed = +2.5 m/min

Start by opening the main menu, by pressing the MENU key.
Then go to the settings menu by pressing the SET key.

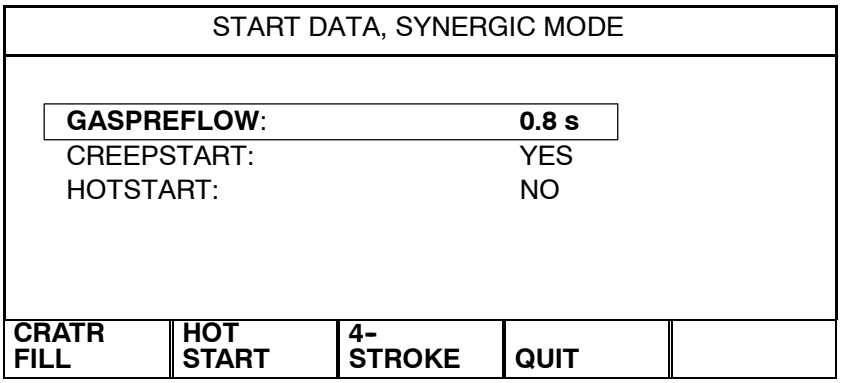
Position the cursor on the line START DATA and press ENTER.



Gas pre-flow time

Here you enter the length of time you want the shielding gas to flow before welding begins.

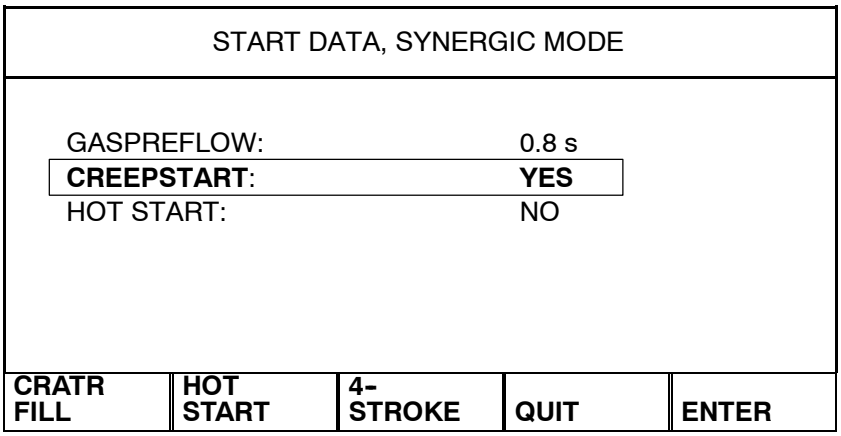
Position the cursor on the line for GAS PREFLOW. Set it to 0.8 s using one of the plus/minus keys



Creep start

Here you simply choose whether you want to use the creep start function or not, i.e. YES or NO. Wire feed speed and creep start are preset and cannot be changed.

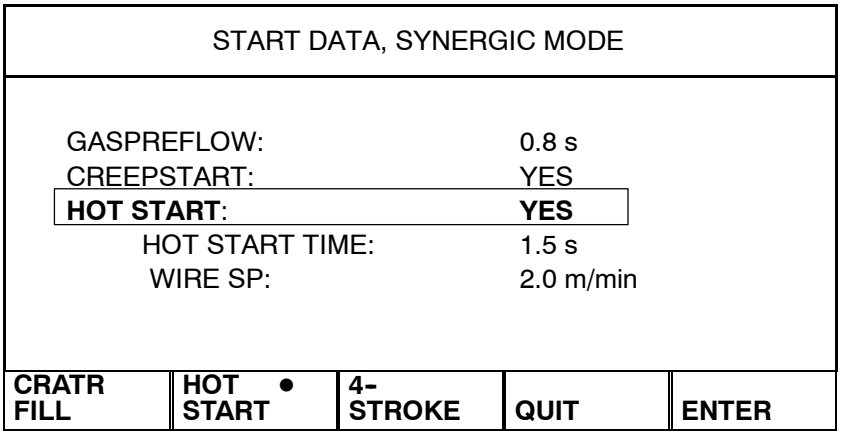
Position the cursor on the line CREEP START. Press ENTER to display the list of options.Set it to YES press ENTER



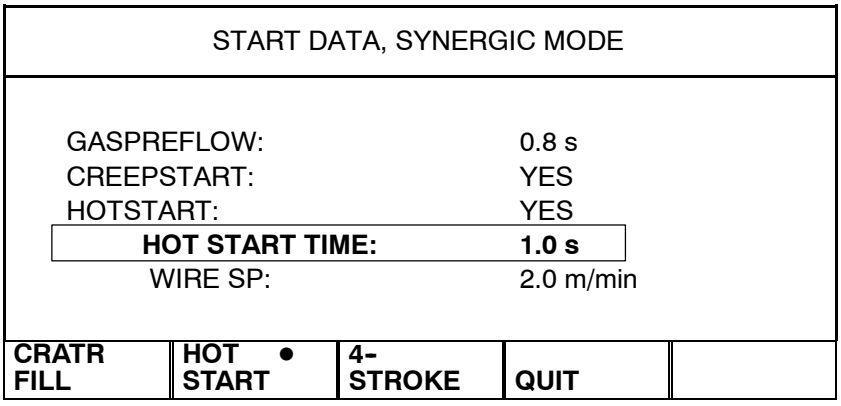
Hot start

To begin with you choose whether you want to use the hot start function or not. If you decide to use the hot start function, you should then enter the hot start time and any increase in the wire feed speed.

Position the cursor on the line HOT START. Press ENTER to display the list of options.Set it to YES press ENTER



Position the cursor on the line HOT START TIME. Set it to 1.0 s using one of the plus/minus keys.



Position the cursor on the line WIRE SP. Set it to 2.5 m/min.

START DATA, SYNERGIC MODE				
GASPREFLOW: 0.8 s CREEPSTART: YES HOTSTART: YES HOT START TIME: 1.0 s **WIRE SP: 2.5 m/min**				
CRATR FILL	**HOT START •**	**4- STROKE**	**QUIT**	

All the start settings have now been made.

Return to the settings menu by pressing QUIT.

2.8.4 Stop data settings

The stop data menu is used to make the settings that affect the stop sequence during MIG/MAG welding.
We will enter the following stop data:

- CRATER FILL = YES
- CRATER FILL TIME =1.5 s
- FINAL WIRE FEED SPEED = 3.0 m/min
- BURNBACK TIME =0.11 s
- GAS POST-FLOW =2.0 s

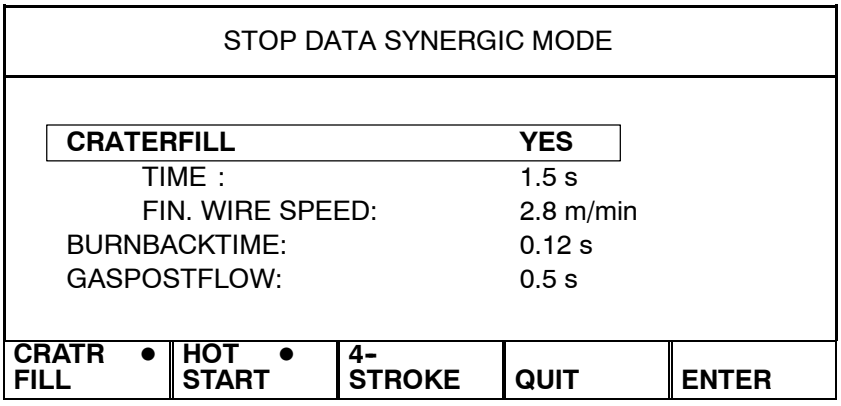
Position the cursor on the line STOP DATA and press ENTER.

WELD DATA SETTING				
VOLTAGE: # 29.0 (+0.0) V WIRE SPEED: * 10.0 m/min INDUCTANCE: 70 % SYNERGIC MODE ON START DATA . . . **STOP DATA . . .**				
CRATR FILL	**HOT START •**	**4- STROKE**	**QUIT**	**ENTER**

Crater fill

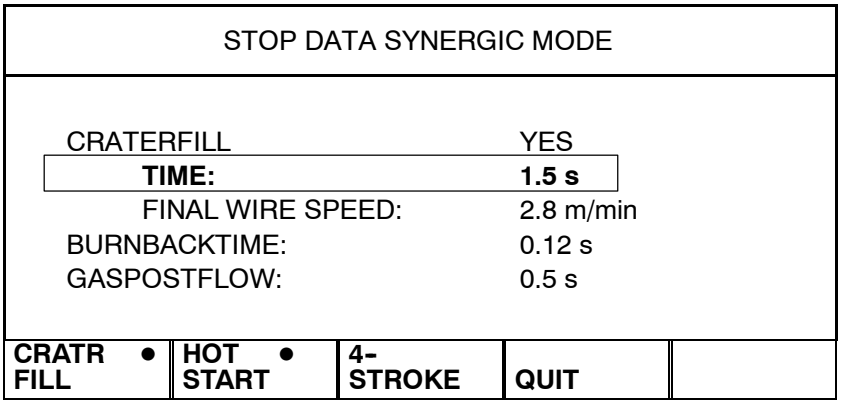
Begin by choosing whether you want to use the crater fill function or not. If you choose to use crater fill you will then also have to set the crater fill time and wire feed speed.

Move the cursor on the line CRATER FILL and press ENTER to display the list of options. Select YES.



Crater fill time

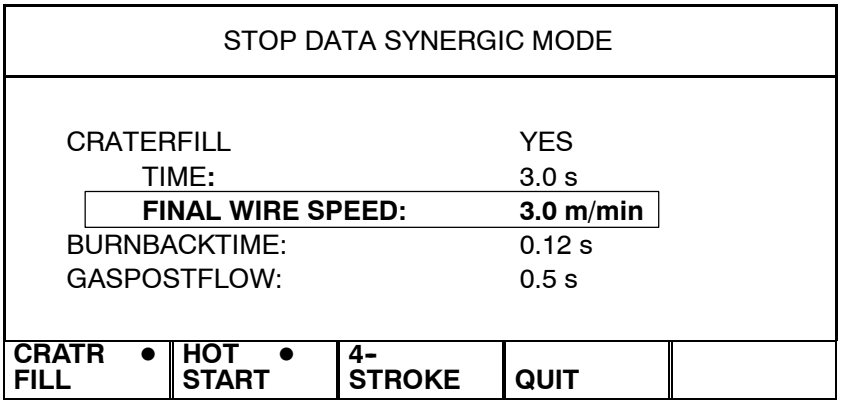
Position the cursor on the line TIME. Set it to 1.5 s using one of the plus/minus keys



Final wire feed speed

This is used to set the wire feed speed that will be used when crater fill is complete.

Position the cursor on the line FINAL WIRE SPEED. Set it to 3.0 m/min using one of the plus/minus keys.



Burnback time

Position the cursor on the line BURNBACK TIME. Set it to 0.11 s using one of the plus/minus keys.

STOP DATA SYNERGIC MODE				
CRATERFILL			YES	
TIME:			3.0 s	
FINAL WIRE SPEED:			4.0 m/min	
BURNBACKTIME:			**0.11 s**	
GASPOSTFLOW:			0.5 s	
CRATR FILL	**HOT START**	**4-STROKE**	**QUIT**	

Gas post-flow

Use this to set the time for which the gas continues to flow after welding is complete.

Position the cursor on the line GAS POST-FLOW. Set it to 2.0 s using one of the plus/minus keys.

STOP DATA SYNERGIC MODE				
CRATERFILL			YES	
TIME:			1.5 s	
FINAL WIRE SPEED:			3.0 m/min	
BURNBACKTIME:			0.11 s	
GASPOSTFLOW:			**2.0 s**	
CRATR FILL	**HOT START**	**4-STROKE**	**QUIT**	

This completes the stop data settings and means that all the weld data settings for MIG/MAG welding have been entered.

3 MMA welding

3.1 Synergic mode

The welding power source also has a synergic mode for MMA welding.
This means that the welding power source automatically optimises the welding characteristics to suit the type and size of electrode you have chosen.

3.2 Basic settings

The basic settings for MMA welding are entered using the controller's main menu.

1. **Welding process = MMA**
2. **Electrode type**

   Three different types of electrode can be chosen if you want to weld in synergic mode.

   - Basic
   - Rutile
   - Cellulosic

3. **Electrode diameter**

The table below shows the electrode diameters that can be selected when the power source is in synergic mode.

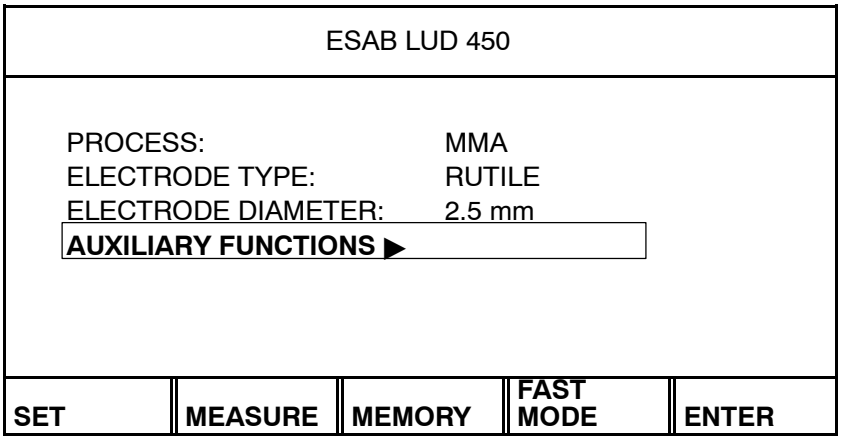
Electrode type	Electrode diameter (mm)
Basic	1.6 2.0 2.5 3.2 4.0 4,5 5.0 5,6 6.0
Rutile	1.6 2.0 2.5 3.2 4.0 4,5 5.0 5,6 6.0
Cellulosic	2.5 3.2

3.3 Welding data

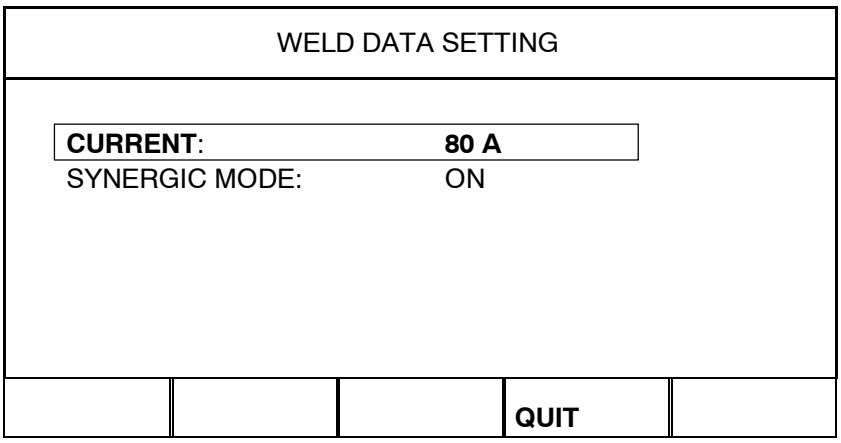
If you stay in synergic mode you only need to set the welding current.
The welding current can also be adjusted during welding by using the +/- keys.
When you adjust the welding current the arc force is automatically adjusted to compensate if the welding power source is in synergic mode.

In the settings menu you can see what value has been chosen for the parameter welding current.

Display the SETUP menu by pressing the **SET** key.



With our chosen combination of electrode type and electrode diameter the power source has set the welding current to 80 A.



3.4 MMA-configuration

See step **9.2.6.**

3.5 Setting-up example MMA

Here is an example of how to set up for MMA welding.

3.5.1 Basic settings

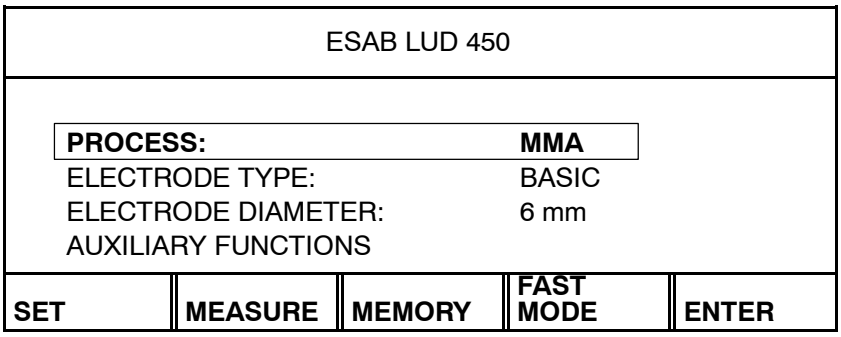
The main menu is used to make the settings that concern choice of electrode.

First we call up the main menu, if this has not already been done, by pressing the MENU key.
We will make the following three settings:

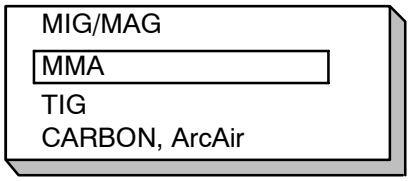
- PROCESS = MMA
- ELECTRODE TYPE= RUTILE
- ELECTRODE DIAMETER = 2.5 mm

Process

Use the arrow keys to select PROCESS. Press ENTER to display the list of options.

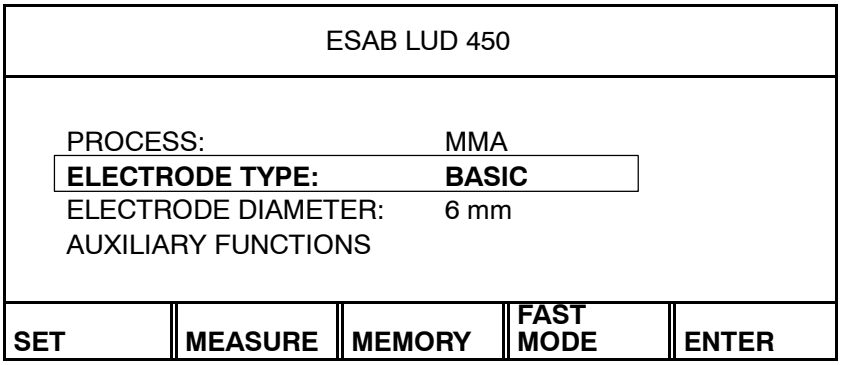


Position the cursor over the MMA option in the list and press ENTER. We have now set the PROCESS = MMA.

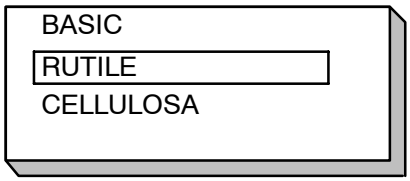


Electrode type

Use the arrow keys to select ELECTRODE TYPE. Press ENTER to display the list of options.

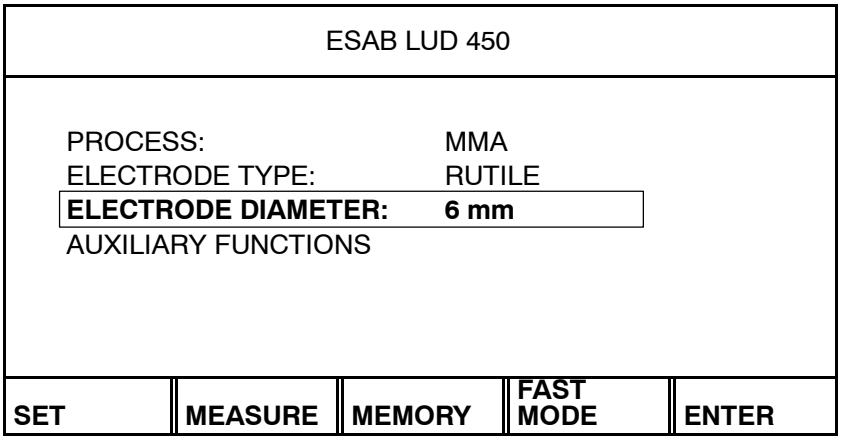


Position the cursor over the RUTILE option in the list and press ENTER. We have now set the ELECTRODE TYPE = RUTILE.

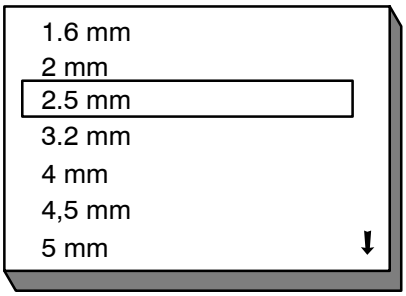


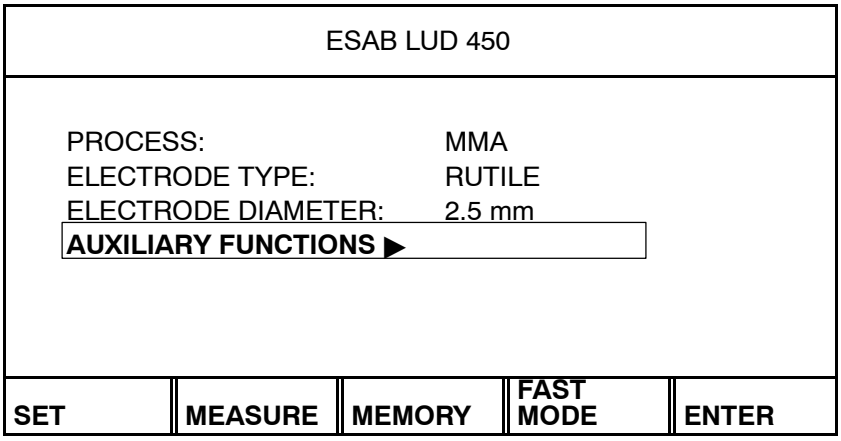
Electrode diameter

Use the arrow keys to select ELECTRODE DIAMETER. Press ENTER to display the list of options.



Position the cursor over the value 2.5 mm in the list and press ENTER. We have now set the ELECTRODE DIAMETER = 2.5 mm.





The next line in the menu is AUXILIARY FUNCTIONS. You can read more about these functions in the section “AUXILIARY FUNCTIONS“ See step **9.**

We have now completed the settings for MMA welding.

4 TIG welding

4.1 Basic settings

The basic settings for TIG welding are made in the main menu.

1. **Welding process = TIG**
2. **Welding method**

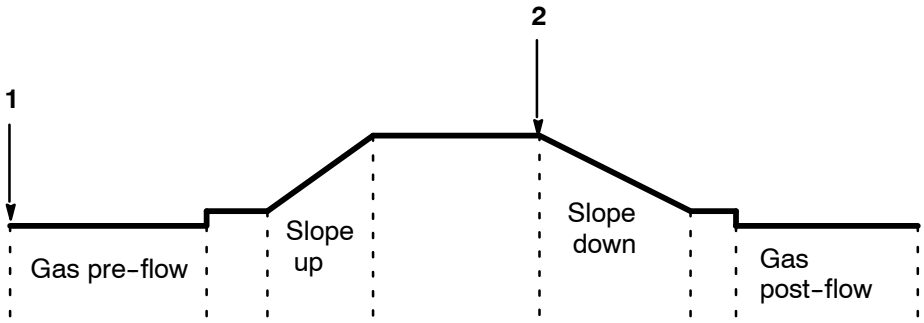
   With TIG welding you have a choice of two different welding methods.
   - Constant current
   - Pulse
3. **Start method**

   There is also a choice of two start methods.
   - Liftarc
   - HF-START

   With Liftarc start you touch the electrode to the workpiece to strike the arc, then raise it slightly. With HF start the arc is struck by a high frequency spark that is produced when the electrode is a certain distance from the workpiece.
4. **Gun trigger mode**

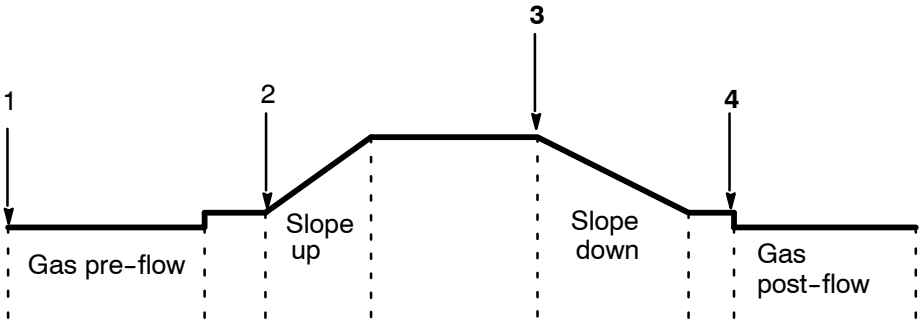
   In TIG welding you can choose whether you want the TIG torch to operate with the trigger latch off or on. The main difference is that with the trigger latch off you have to hold the trigger in during welding, but when it is on you can release the trigger during welding. The difference between having the trigger latch off or on is illustrated in the following diagrams, along with the other functions in the start/stop cycle.

Trigger latch off



With the trigger latch off, gas pre-flow begins when the TIG gun trigger is pressed (1). The current then rises to the pilot level (a couple of amperes) and the arc ignites. The current then rises to the set value (following the Slope-up slope if applicable). When the trigger is released (2) the current falls back to the pilot level (following the Slope-down slope if applicable) and the arc is extinguished. The gas continues to flow for the post-flow period, if applicable.

Trigger latch on



With the trigger latch on, gas pre-flow begins when the TIG gun trigger is pressed (1). When the gas pre-flow period has elapsed the current rises to the pilot level (a couple of amperes) and the arc ignites.
When the trigger is released (2) the current rises to the set value (following the Slope-up slope if applicable).
When the trigger is pressed again (3) the current again rises to the pilot level(following the Slope-down slope if applicable).
When the trigger is released again (4) the arc is extinguished and the gas post-flow period begins (if applicable).

When you are in the weld data settings menu or the measure menu you can switch the trigger latch off or on using one of the soft keys.

4.2 Welding data settings

The values of the welding parameters are set using the settings menu. Certain parameters are specific to the chosen method and certain are common to both TIG methods. The following parameters can be set for TIG welding.

See the APPENDIX step **10**. for details of parameter setting ranges.

Method CONSTANT CURRENT

- Current
- Slope-up
- Slope-down
- Gas pre-flow
- Gas post-flow

Method PULSE

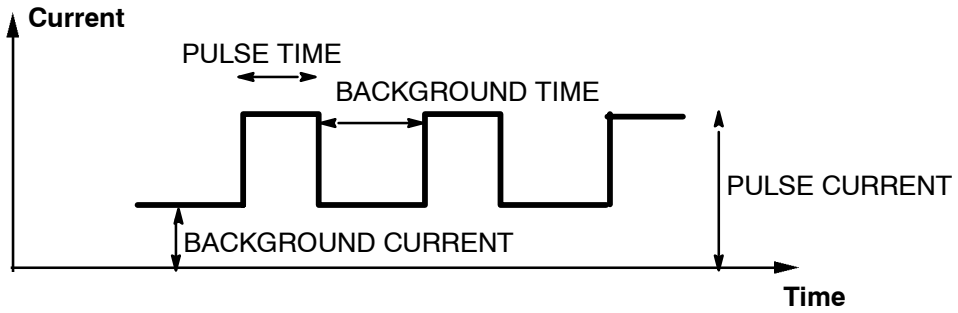
- Pulse current
- Background current
- Pulse time
- Background time
- Slope-up
- Slope-down
- Gas pre-flow
- Gas post-flow

Current

The term current refers here to the welding current when welding with constant current.

Pulse current and background current

When using pulsed current you have to set several parameters that are linked to the welding current. Pulse current and background current indicate the uper and lower limits of the current, see the diagram below.



Pulse time and background time

The pulse time sets the duration of the current pulses.
The background time sets the time between pulses.
For welding with pulse current, see the above diagram. The adjustment range for pulse time and background time is 0.001–5.000 s.

Gas pre-flow and gas post-flow

The parameters gas pre-flow and gas post-flow are used to set how long you want the gas to flow before and after welding.

Slope-up and Slope-down

The Slope parameters govern the gradual rise and fall of the we lding current over a given time.

4.3 TIG-configuration

See step **9.2.6.**

4.4 Setting-up example TIG

The following explains how to set up for TIG welding using the constant current method. The setting-up procedure is similar for pulse welding.

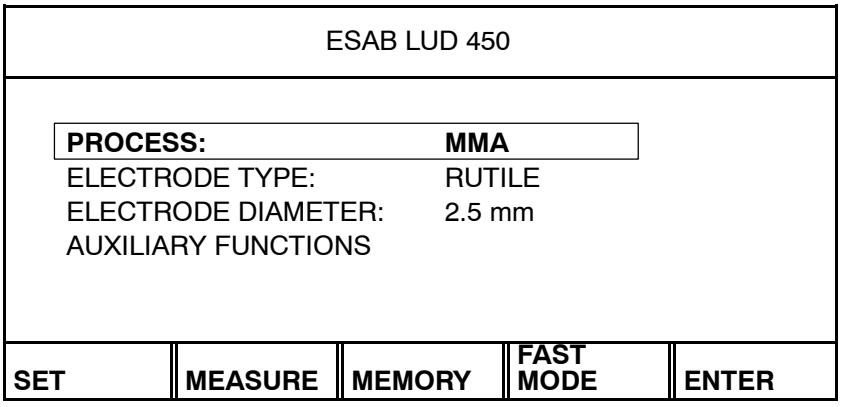
4.4.1 Basic settings

We start by displaying the main menu, if this has not already been done, by pressing the MENU key.
We will make the following four settings:

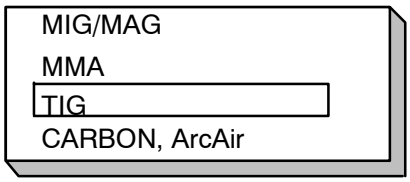
- PROCESS = TIG
- METHOD = CONSTANT CURRENT
- START METHOD = LIFT ARC
- GUN TRIGGER MODE= 2-STROKE

Process

Use the arrow keys to select PROCESS. Press ENTER to display the list of options.



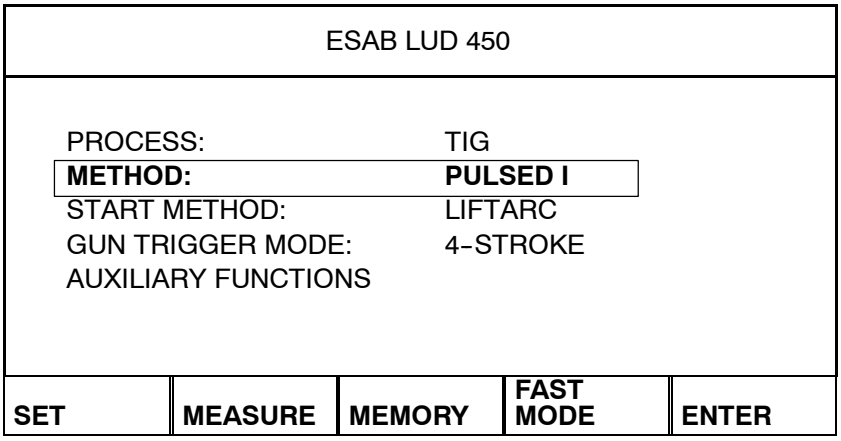
Position the cursor on the TIG option in the list and press ENTER. We have now set the PROCESS = TIG.



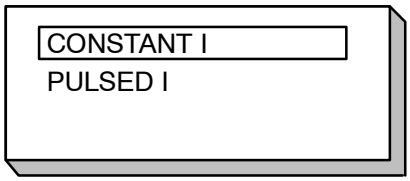
GB

Method

Position the cursor on the line METHOD. Press ENTER to display the list of options.

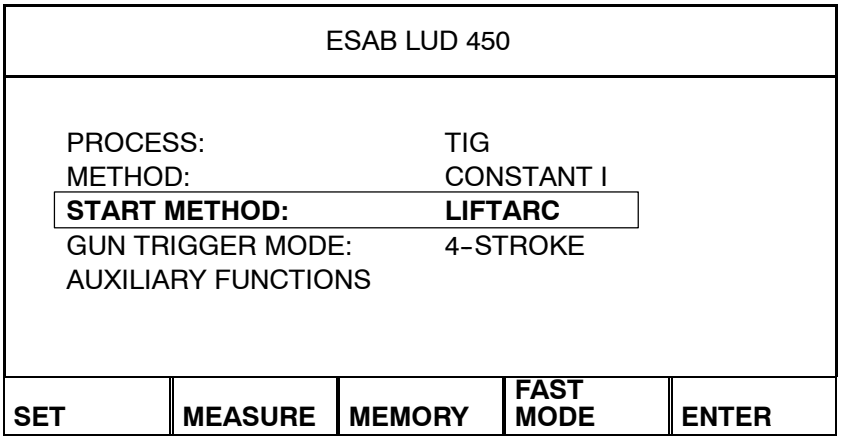


Position the cursor on the line for CONSTANT I in the list and press ENTER.
We have now set the METHOD = CONSTANT CURRENT.

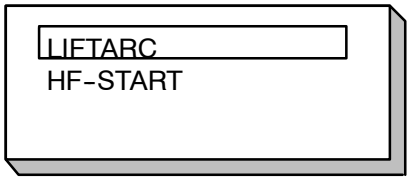


Start method

Position the cursor on the line START METHOD. Press ENTER to display the list of options.



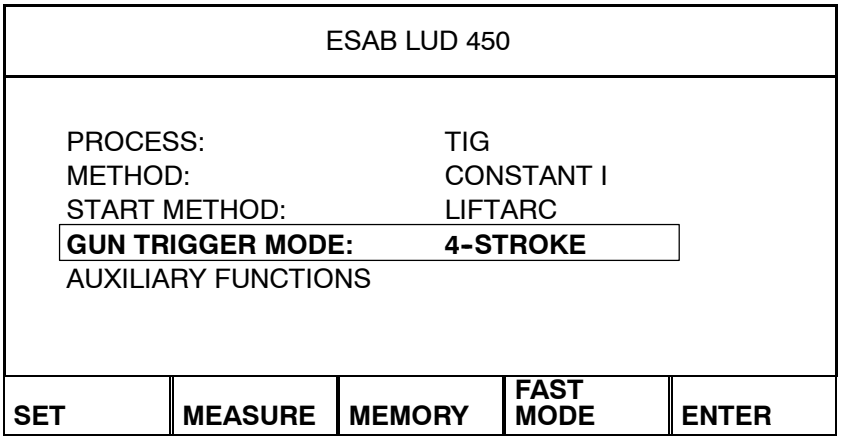
Position the cursor on the line for LIFTARC in the list and press ENTER. We have now set the START METHOD = LIFTARC.



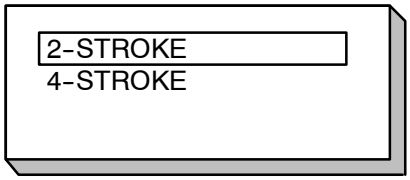
GB

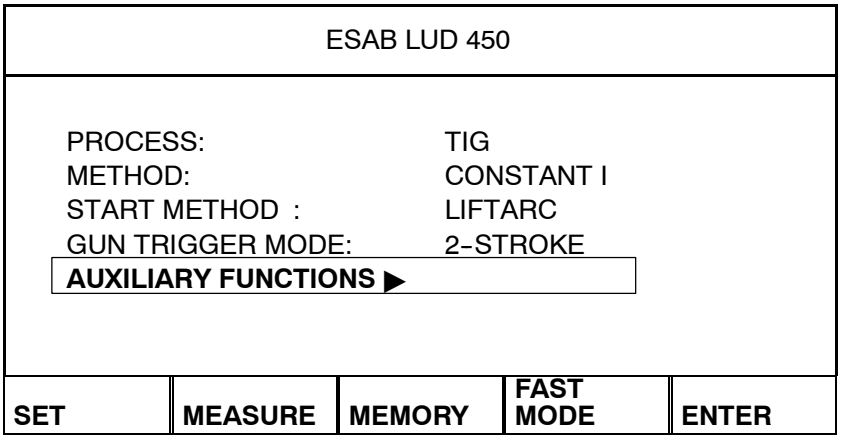
Gun trigger mode

Position the cursor on the line GUN TRIGGER MODE. Press ENTER to display a list of options.



Position the cursor on the line for 2-STROKE in the list and press ENTER. We have now set the GUN TRIGGER MODE = 2-STROKE.





The next line in the menu is AUXILIARY FUNCTIONS. See the section “AUXILIARY FUNCTIONS“ See step **9**. for more information.

4.4.2 Weld data settings

Use the settings menu to set the values of the various welding parameters.

We will make the following settings:

- CURRENT = 200 A
- SLOPE-UP TIME = 2.0 s
- SLOPE-DOWN TIME = 1.4 s
- GAS PRE-FLOW = 3.0 s
- GAS POST-FLOW = 5.0 s

Press MENU key, call up the settings menu by pressing the **SET** key.

Current

Position the cursor on the line for CURRENT. Set the value to 200 A using one of the plus/minus keys.

WELD DATA SETTING				
CURRENT:	**200 A**			
SLOPE UP TIME:	4,0 s			
SLOPE DOWN TIME:	6,0 s			
GASPREFLOW:	2.5 s			
GASPOSTFLOW:	3.3 s			
GAS PURGE	**4 STROKE**		**QUIT**	

Slope-up and Slope-down

The Slope-up and Slope-down parameters are each linked to the plus and minus keys respectively. To set the Slope-up time use the uper key, and to set the Slope-down time use the lower key.

Move the cursor to the line for SLOPE UP and SLOPE DOWN TIME. Set the SLOPE UP TIME to 2.0 s by stepping with the upper plus/minus key.

WELD DATA SETTING				
CURRENT:	200 A			
SLOPE UP TIME**:**	**# 2.0 s**			
SLOPE DOWN TIME:	*** 6.0 s**			
GAS PRE-FLOW:	2.5 s			
GAS POST-FLOW:	3.3 s			
GAS PURGE	**4 STROKE**		**QUIT**	

Set the SLOPE DOWN TIME to 1.4 s by stepping with the lower plus/minus- key.

WELD DATA SETTING				
CURRENT:	200 A			
SLOPE UP TIME:	**# 2.0 s**			
SLOPE DOWN TIME:	***1.4 s**			
GASPREFLOW:	2.5 s			
GASPOSTFLOW:	3.3 s			
GAS PURGE	**4 STROKE**		**QUIT**	

Gas pre-flow and gas post-flow

The parameters gas pre-flow and gas post-flow are each linked to their own specific plus/minus key in the same way as the Slope parameters above. The uper plus/minus key is used to set the gas pre-flow and the lower one is used to set the gas post-flow.

Move the cursor to the line for GAS PRE-FLOW and GAS POST-FLOW. Set the GAS PRE-FLOW to 3.0 s by stepping with the upper plus/minus key.

WELD DATA SETTING				
CURRENT:	200 A			
SLOPE UP TIME:	2.0 s			
SLOPE DOWN TIME:	1.4 s			
GASPREFLOW:	**# 3.0 s**			
GASPOSTFLOW:	***3.3 s**			
GAS PURGE	**4 STROKE**		**QUIT**	

Set the GAS PRE-FLOW to 5.0 s by stepping with the lower plus/minus key.

WELD DATA SETTING				
CURRENT:	200 A			
SLOPE UP:	2.0 s			
SLOPE DOWN:	1.4 s			
GASPREFLOW:	**# 3.0**			
GASPOSTFLOW:	***5.0**			
GAS PURGE	**4 STROKE**		**QUIT**	

We have now completed the set-up procedure for TIG welding.

5 Arc air gouging

5.1 Synergic mode

The power source has a synergic mode for arc air gouging.
This means that the power source automatically selects a suitable value for the **voltage** on the basis of the chosen **electrode diameter**.

It is possible to use electrodes with a different diameter to those displayed on the controller, but this means that the user must make the necessary settings for certain parameters.

5.2 Basic settings

The basic settings for arc air gouging are made in the controller's main menu.

1. **Welding process = ARC AIR GOUGING (Carbon, ArcAir)**
2. **Electrode diameter**

The table below shows the electrode diameters that can be used when the power source is in synergic mode.

Electrode diameter
4 mm (3/16 in)
5 mm
6 mm (1/4 in)
8 mm

5.3 Welding data

If you use the power source in synergic mode there is actually no need to set any of the welding parameters. The **voltage** parameter can however be adjusted if wished. The parameters shown in italics are constant, i.e. they are unaffected by any change in voltage.

Welding parameters for arc air gouging

- Voltage
- *Inductance*
- *Control type*

See the "APPENDIX" See step **10.** for a table giving the full range of parameter settings.

5.4 Setting-up example for arc air gouging

5.4.1 Basic settings

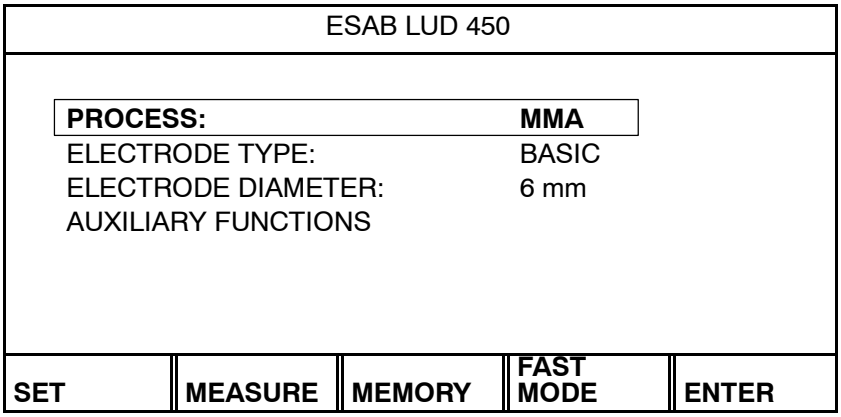
Use the main menu to set the electrode diameter.

To start, call up the main menu by pressing the MENU key.
We will make the following two settings:

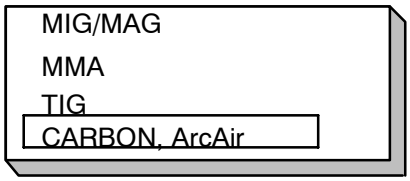
- PROCESS = ARC AIR GOUGING (Carbon, ArcAir)
- ELECTRODE DIAMETER = 8 mm

Process

Use the arrow keys to select the PROCESS line. Press ENTER to display the list of options.

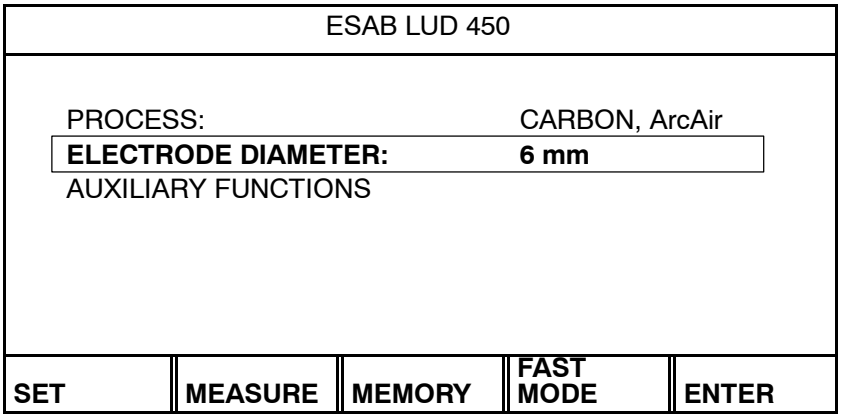


Position the cursor on the line CARBON ArcAir in the list and press ENTER. We have now set the PROCESS = ARC AIR GOUGING.

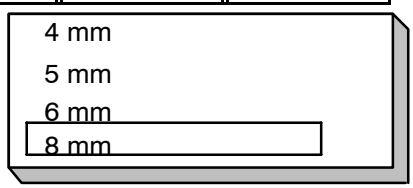


Electrode diameter

Use the arrow keys to select the line ELECTRODE DIAMETER. Press ENTER to display the list of options.



Position the cursor on the line 8 mm and press ENTER. The setting ELECTRODE DIAMETER = 8mm is now complete.

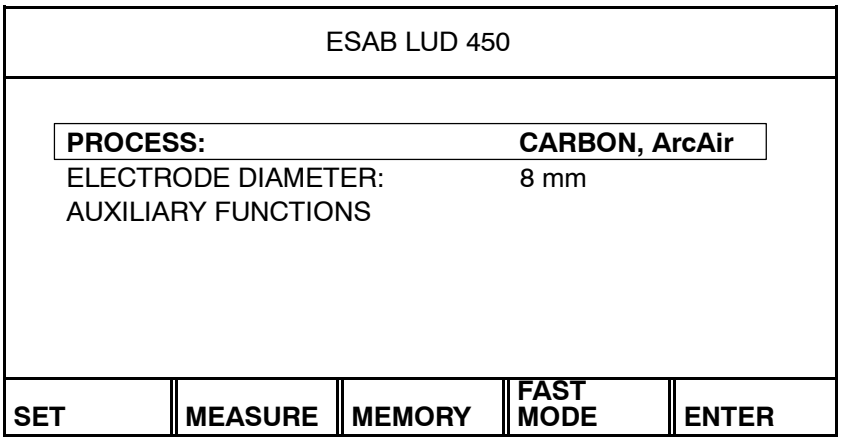


The set-up procedure for arc air gouging is now complete.

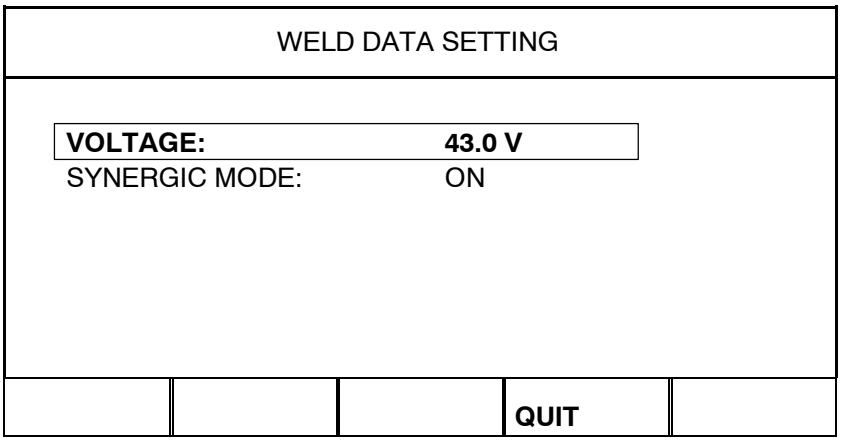
5.4.2 Welding data

In the settings menu you can see what value has been selected for the voltage parameter. If necessary you can also adjust the voltage setting.

Go to the settings menu by pressing the SET key.



On the basis of our electrode diameter setting the power source has set the voltage to 43 V.



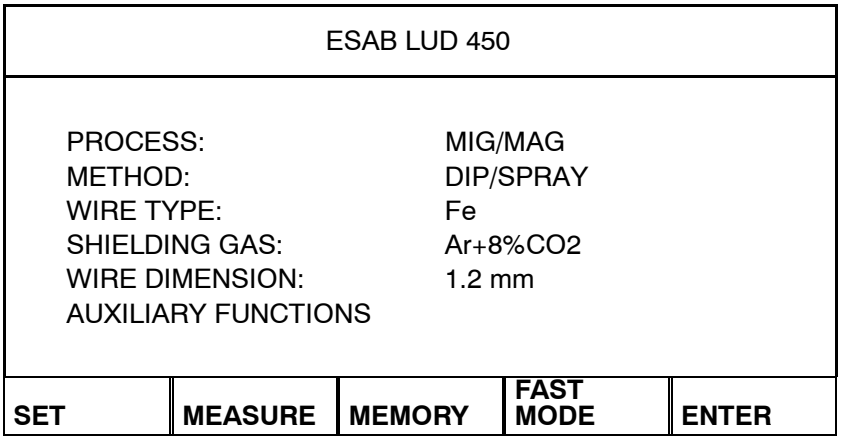
6 MEASURED VALUE DISPLAY

6.1 Description of measured value display

The measured value display lets you see the measured values of various welding parameters during welding. Which parameters are displayed depends on which welding process you have selected.
The example below shows a measured value display for MIG/MAG.

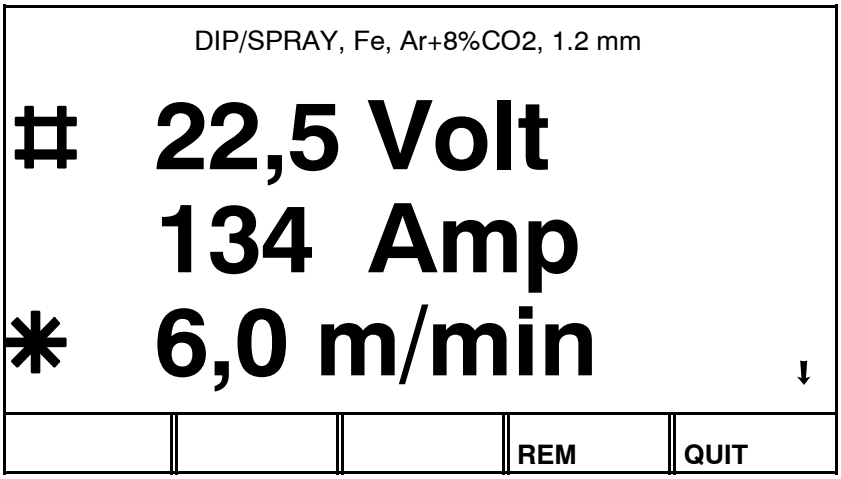
TIP!
In pulse welding you can choose whether the voltage is displayed as the overall average or the pulse average.
This setting can be made under MIG/MAG basic settings. See section **9.2.4.3.**

If you want to see the measured value display; first make sure the main menu is displayed. Press the **MEASURE** key.

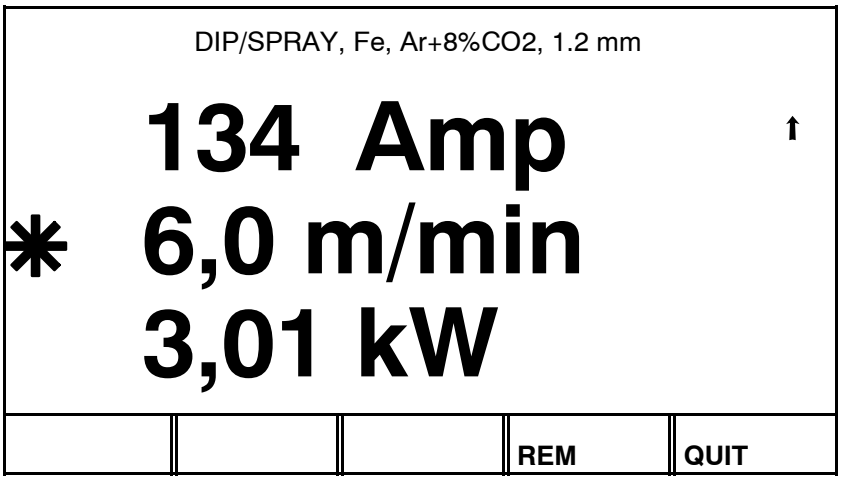


The measured value display could look like this. The arrow at the bottom right of the display indicates that there is more information than can be displayed.

Scroll down using the arrow down key.



A fourth value is visible in the display.



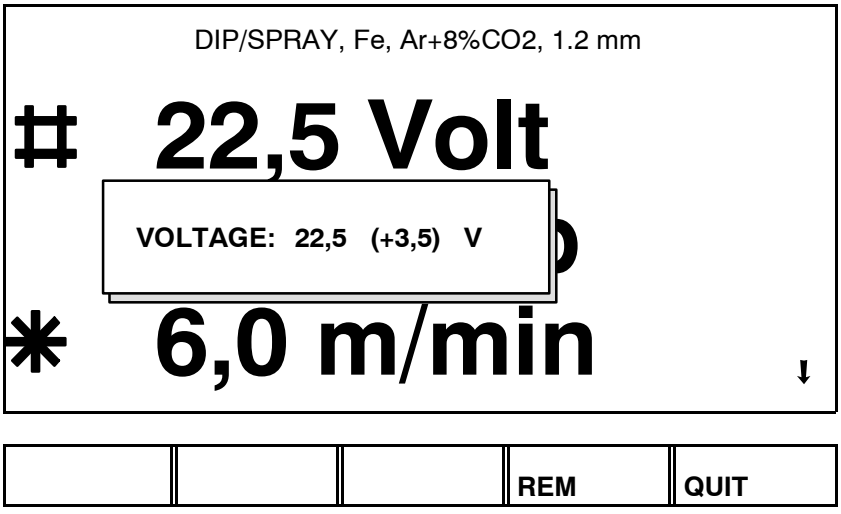
6.2 Changing set values

You can change the value of certain parameters in the measured value display. Which parameters can be changed depends on which welding process is selected.

The parameter values that can be changed are always identified by ⌗ or ✱.

Change by pressing or

The window that pops up will disappear after 1.5 s if neither of the buttons are used.



7 MEMORY

The controller can store **up to 99 sets of weld data**. Each of these sets is given a number from 1 to 99. If the weld data memory is full, i.e. if 99 sets of data are already stored and you want to save an additional set of data, then the **oldest set of weld data is automatically deleted**.

You can also **delete** and **copy** sets of weld data and **recall** a set of weld data to the working memory.

Here is an example showing how to store, recall, copy and delete data.

7.1 Store

When you want to store a set of data, first make sure the main menu is displayed. Press the MEMORY key. If the weld data memory is empty the display will appear as follows.

MEMORY FUNCTIONS – STORED DATA SETS				
* NO STORED DATA SETS *				
STORE				**QUIT**

Example

We will now store a set of weld data. We will store it in memory location 10. Press the STORE key. The display will appear as follows.

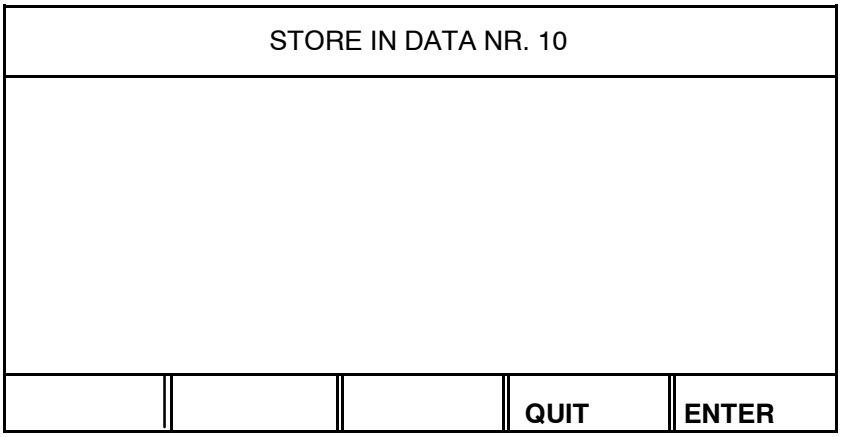
If you press ENTER now the set of data will be saved as number 1, as indicated by the top line of the display.

STORE IN DATA NR. 1				
			QUIT	**ENTER**

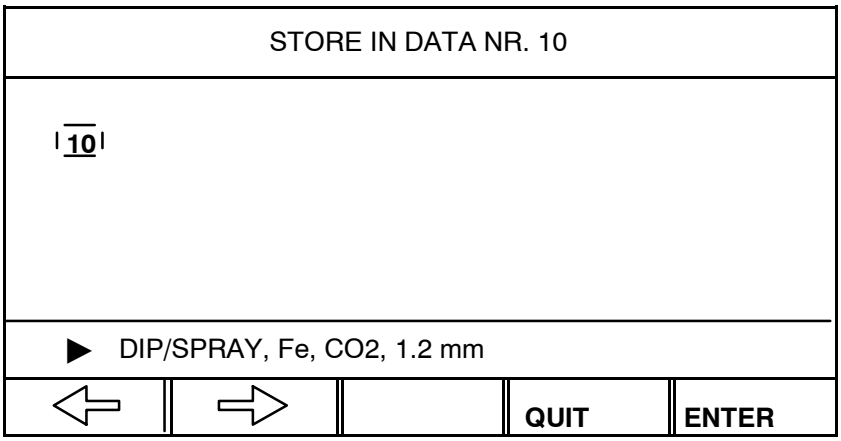
You can use the plus/minus keys to select the memory location you want to store the set of data in. This is shown in the top line of the display.

The number shown in the top line of the display is the first empty position found in the memory.

Select number 10 using the plus/minus keys. Press ENTER.



The set of data is now stored as number 10. At the bottom of the display you can see part of the contents of data set 10.



To return to the memory menu press the QUIT key.

Tip!
If the display indicates **STORE IN DATA NR. 1,** you can go directly to set 99 by pressing the minus on either or .

GB

7.2 Delete

In the memory menu you can delete one or more sets of weld data.

Example

We will now delete the set of data we stored in the earlier example. Press the DELETE key.

MEMORY FUNCTIONS – STORED DATA SETS				
10 **50**				
DIP/SPRAY, Fe, Ar+20% CO2, 1.2 mm				
STORE	**DELETE**	**RECALL**	**COPY**	**QUIT**

The last stored set of data is marked automatically. If more than one set of data has been stored you can move the cursor between them using the arrow left and arrow right keys.

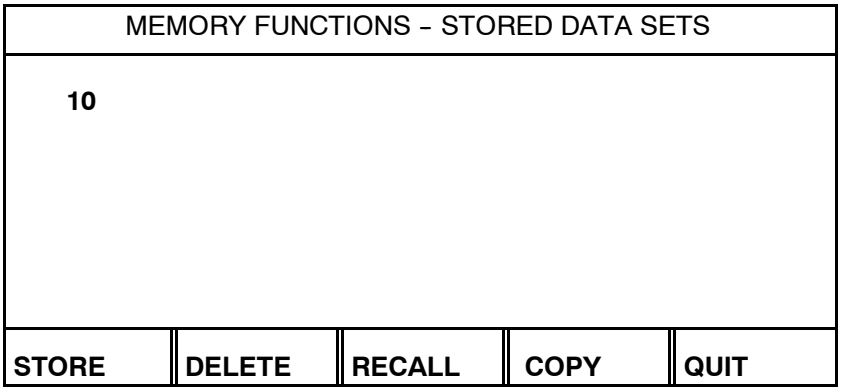
Press ENTER to confirm you want to delete data set number 10.

DELETE WELD DATA NR. 10				
10				
▶ DIP/SPRAY, Fe, Ar+20% CO2, 1.2 mm				
⇦	⇨		**QUIT**	**ENTER**

GB

7.3 Recall

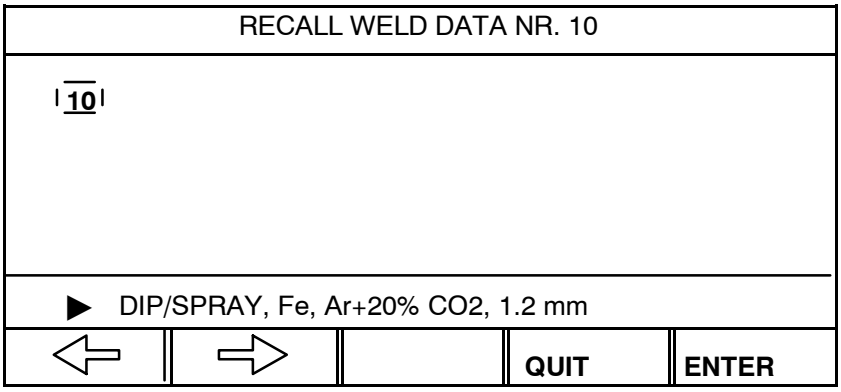
To recall a previously stored set of data; first check that the memory menu is displayed. Press the RECALL key.



Example

The last stored set of data is marked automatically. If there is more than one set of data you can move the cursor between them using the arrow left and arrow right keys.

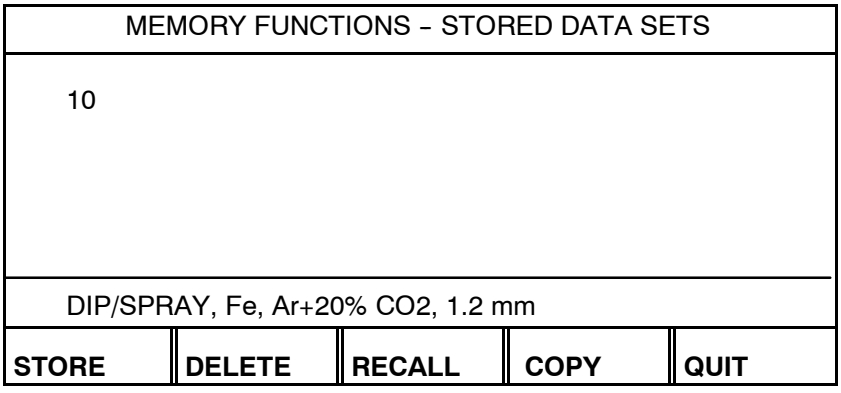
Press ENTER to confirm that you want to recall data set number 10.



Return to the memory menu by pressing the QUIT key.

7.4 Copy

You can copy the contents of a previously stored set of data into another memory location. Start by pressing the COPY key.



GB

Example

The last stored set of data is marked automatically. If more than one set of data has been stored you can move the cursor between them using the arrow left and arrow right keys. We will now copy the contents of memory location 10 into location 50.

Use either of the plus/minus keys to mark the memory location you want to copy to.

Scroll forward to number 50 using the plus key and ENTER.

COPY WELD DATA NR. 10 TILL NR. 50				
10				
▶ DIP/SPRAY,Fe, Ar+20% CO2, 1.2 mm				
⇦	⇨		**QUIT**	**ENTER**

STORE OVER EXISTING WELD DATA **?**				
10				
▶ DIP/SPRAY,Fe, Ar+20% CO2, 1.2 mm				
			NO	**YES**

The weld data in location 10 has now been copied to memory location 50.

If memory location 50 was already occupied a message appears in the display.

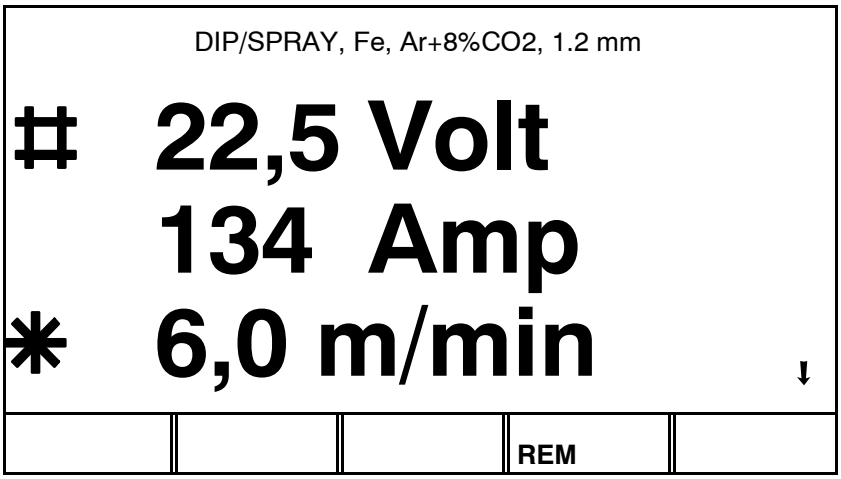
COPY WELD DATA NR. 10 TILL NR. 50				
10 50				
▶ DIP/SPRAY,Fe, Ar+20% CO2, 1.2 mm				
⇦	⇨		**QUIT**	**ENTER**

Press the QUIT key to return to the memory menu.

7.5 Remote control

To start, we call up the main menu by pressing the MENU key. Then select the measure menu by pressing the MEASURE key.

From the measure menu you can switch to operating the equipment by remote control by pressing the “Remote“ key.
There are four different remote control devices:



Digital remote control

The digital remote control is used when you want to recall weld data settings from the weld data memory without using the standard controller.

- Aristo Control 5-program.
  This remote control lets you recall 5 different sets of weld data settings from memory. You save them in memories 1-5.
  You can also adjust the voltage for the welding program you have recalled.

Analogue remote control

With an analogue remote control you can control the primary parameters of the welding process from a unit other than the standard controller.

- Aristo Control Synergic PAE 2.
  With this remote control you can increase/decrease the wire feed speed and voltage either side of the synergic line you have chosen.
- Esab PSF welding torch with 2 knobs.
  This welding torch has 2 knobs that allow you to increase/decrease the wire feed speed and voltage either side of the synergic line you have chosen. It is also possible to adjust these during welding.
- Esab PSF welding torch with 3 programs.
  This welding torch has a three position key.
  The key lets you recall 3 different sets of weld data settings from memory, for example for root beads and filler beads. It is also possible to change welding program during welding.

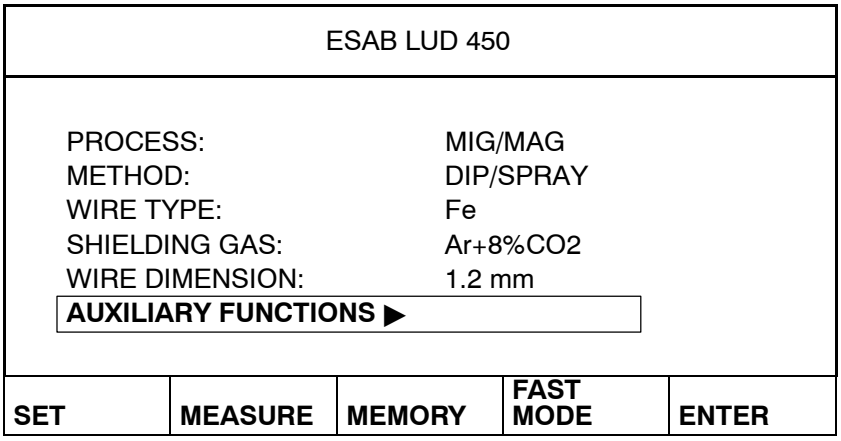
7.5.1 Configuring a remote control

See step **9.2.3.**

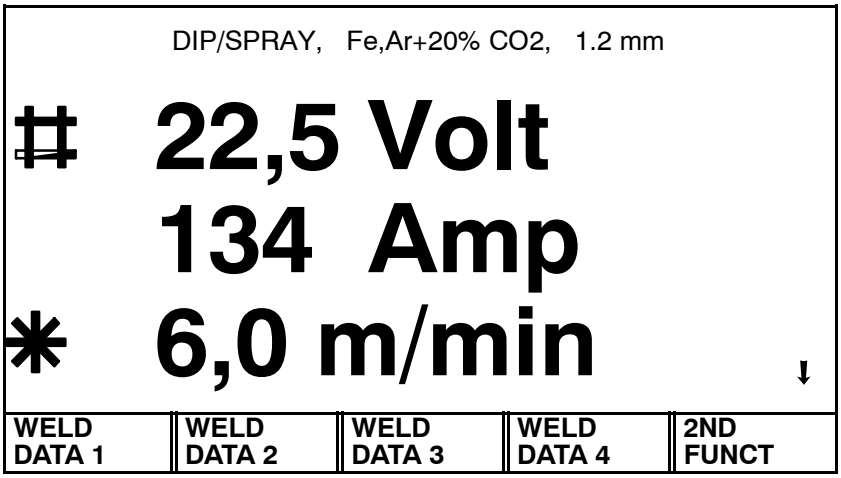
8 FAST MODE

8.1 Description of fast mode

If you have stored one or more sets of weld data in the weld data memory you can make one or more of them (maximum of four) available through the FAST MODE key in the main menu.



When you press the fast mode key the display may appear like this.



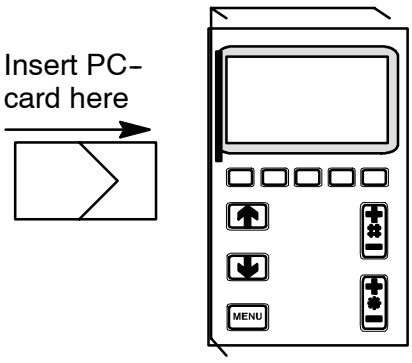
Four of the soft buttons can thus be ”linked” to a weld-data setting of their own in the weld-data memory. See soft button function under section 9.2.4.2.
The fifth soft button’s 2nd function is used to shift functions for the four soft buttons. You can shift the four soft buttons from having weld-data settings to having those functions available in measure mode (gas purge, hot start, wire inching, trigger mode, crater fill, creep start, etc.)

8.2 Configuring the fast mode keys

See step **9.2.8.1.**

9 AUXILIARY FUNCTIONS

9.1 Memory card operations



In order to use the memory card functions you must first install the PC card.

1. Turn off the power to the welding machine
2. Insert the PC card
3. Turn on the power
4. Press auxiliary functions, ENTER
5. Press memory card operation, ENTER

The following display appears:

MEMORY CARD OPERATIONS				
WELD DATA SETS				
STORE	**DELETE**	**RECALL**	**QUIT**	

STORE
This is used to save weld data settings (in memory locations 1-99) to the PC card using the controller.
If the same weld data is already stored on the card it will be **written over** by the data in the controller's own memory.

Exempel

The weld data settings in the controller are.

Setting control

1	2	3	10	12	50

The PC card is empty

PC card

Press STORE.
The weld data settings from the controller are now stored on the PC card

PC card

1	2	3	10	12	50

DELETE
Use this if you want to delete the contents of the PC card memory (**all weld data settings**).

Example

The weld data settings on the PC card are:

PC-card

1 2 3 10 12 50

Press DELETE. The PC card's memory is now empty.

PC-card

RECALL
This is used to copy weld data settings from the PC card to the controller.
If a weld data setting is already stored in the controller's own memory it will be **written over** by the settings stored on the PC card.

Example

Press RECALL.

Setting control

1 2 3 10 12 50

PC-card

2 3 4 5 6

The controller now has 3 new sets of weld data settings (4, 5, 6) and sets 2 and 3 have been updated with the settings that were stored on the PC card.

Setting control

1 2 3 4 5 6
10 12 50

Error codes

If the controller detects an error in the PC card you will see an error code that briefly describes the error in question.

Check the following:

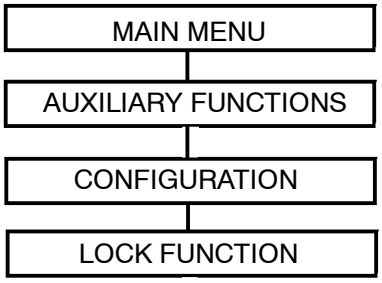
- That the PC card is properly installed.
- That the PC card is not of an unknown or unapproved make.
- That the data stored on the card is compatible with the software in the controller.
- That the PC card has the correct version number and is using the correct format.

9.2 Configuration

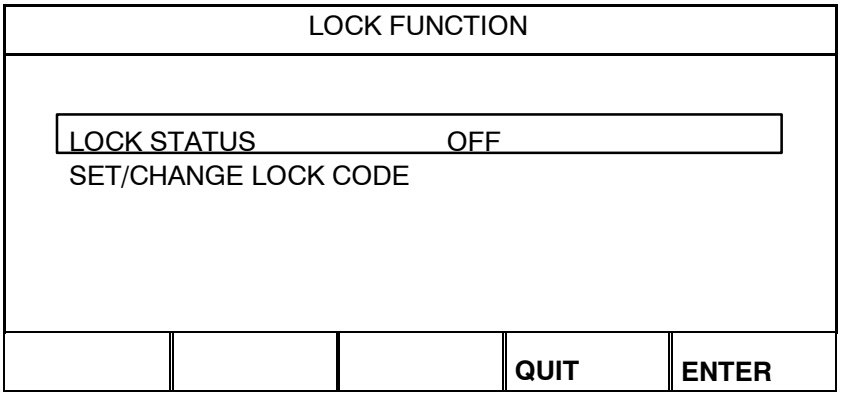
9.2.1 Language and Unit of length

See step **1.3.**

9.2.2 Lock function



Sometimes you may want to restrict access to certain controller functions to prevent someone else from changing important parameters or settings.
When the password function is active and the measure, (remote control) or fast mode menus are selected, a password is requested whenever you try to return to the main menu by pressing the QUIT or MENU keys.
Normally the equipment starts up in one of these three menus when you first switch it on, and the only way to exit in order to go to other memories is to give the right password.



In PASSWORD MODE the password function can be switched off without deleting the existing password. If you try to switch on the password function when no password is stored, the display shows a computer-like “keyboard“ which you can use to enter a new password.

When you activate the password a small icon of a key appears on the first line of the display to show that the password function is activated. You can then move freely between the menus until you go into the measure menu or fast mode menu, which trigger the password function and prevent the user from exiting these menus without first entering the password.

In ENTER/CHANGE PASSWORD you can edit the existing password or enter a new one.
The password can consist of up to any10 letters or numbers.

Deactivating password function

When you are in the measure menu or fast mode menu with the password function **deactivated**, you can exit these menus at any time by pressing QUIT or the MENU key to get back to the main menu.
If the lock function is **active** and you try to exit, the following message will be displayed to warn the user about the password protection.

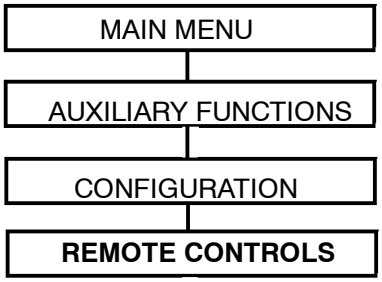
From here you can choose QUIT if you change your mind and want to go back to the previous menu, or continue by pressing ENTER to input the password.
This will take you to the keyboard display so that you can type in the password and confirm it by pressing the enter key on the keyboard.

If the password is incorrect, you will see an error message that gives the user the option of trying again or going back to the original menu, i.e. the measure menu or fast mode menu.

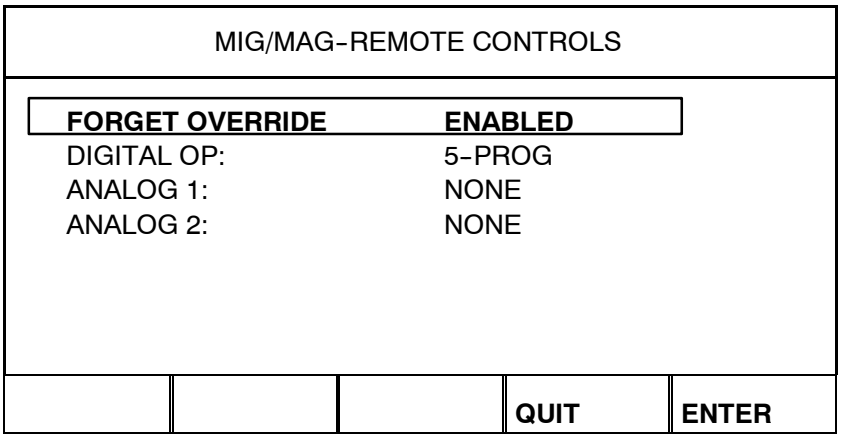
If the password is correct, all restrictions on moving to another menu will be lifted, but the password function will still remain active, this means that you can leave the measure/fast mode menus temporarily, but when you go back to them the password will be activated again.

If you want to make changes outside the measure/fast mode menus (e.g. change settings, deactivate password function, etc.) you can return to them and password mode and reactivate the password to restrict the user to the measure/fast mode menus again.

9.2.3 Remote controls



All remote control configurations apply to any wire feed unit that is connected.
If you deselect ANALOG1 this will affect both wire feed units if you are using twin wire feed units.

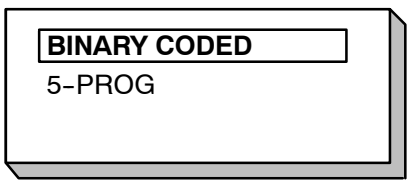


Move the cursor to the line FORGET CHANGE, and press ENTER to display a list of options.

The forget change function in “on“ mode means you always have access to the original weld data in the selected memory location when you come to the end of a weld.
In other words, if you have made a change to a synergic line, for example increased the voltage by 2 V, when you finish the current weld that change will be cancelled and the original data will be recalled.
This is useful when testing new welding parameters, for example.

Configuring a digital remote control

When using a digital remote control you must specify the type of device that is used; a 5-program device or 32-program device (BINARY CODED).
If you position the cursor on the line DIGITAL OP and press ENTER you will see a list of the available options.



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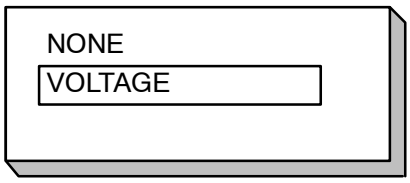
Configuring an analogue remote control

When you use an analogue remote control you should use the controller to specify which potentiometer(s) you want to use (maximum of two).

The controller designates the potentiometers ANALOG 1 and ANALOG 2 and assigns specific welding parameters to each, depending on the welding process, e.g. voltage (ANALOG 1) and wire feed speed (ANALOG 2) for MIG/MAG.

If you position the cursor on the line ANALOGUE 1 and press ENTER you will see a list.

You can now choose whether the potentiometer ANALOG 1 is to be used (VOLTAGE) or not (NONE).



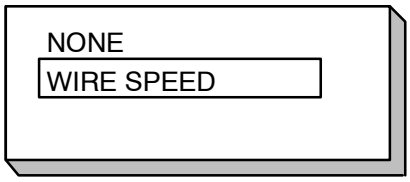
Select the line VOLTAGE from the list and press ENTER.

The following display apppears

MIG/MAG - REMOTE CONTROLS				
FORGET OVERRIDE			ENABLED	
DIGITAL OP:			5-PROG	
ANALOG 1:			VOLTAGE	
ANALOG 2:			NONE	
RANGE ON INPUTS:				
ANALOG 1, DIG +/-		MIN:	# 8.0 V	
		MAX	* 50,0 V	
			QUIT	**ENTER**

If you position the cursor on the line ANALOGUE 2 and press ENTER you will see a list.

You can now choose whether the potentiometer ANALOG 2 is to be used (WIRE SPEED) or not (NONE).



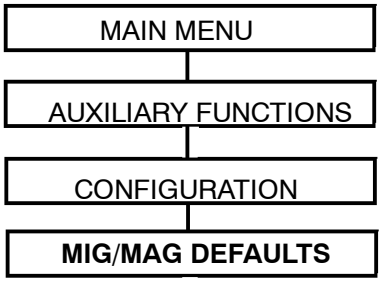
Select the line WIRE SPEED from the list and press ENTER.

The following display apppears

MIG/MAG - REMOTE CONTROLS				
FORGET OVERRIDE			ENABLED	
DIGITAL OP:			5-PROG	
ANALOG 1:			VOLTAGE	
ANALOG 2:			WIRE SPEED	
RANGE ON ANALOG INPUTS:				
ANALOG 1, DIG +/-		MIN:	# 8.0 V	
		MAX:	* 60 V	
ANALOG 2		MIN:	# 1.5 m/min	
		MAX:	* 25 m/min	
			QUIT	**ENTER**

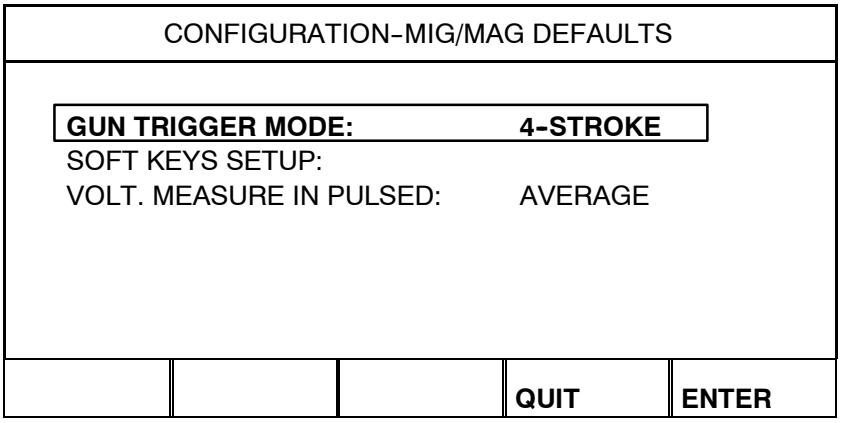
You should also set the control range for the potentiometer(s) you will use. You do this by using the plus/minus keys on the controller to specify a minimum and maximum value.
This only applies to non-synergic mode. In synergic mode you set ANALOG1 to +- 10 V in relation to the chosen synergic line, while ANALOG 2 wire feed is set to non-synergic.

9.2.4 MIG/MAG defaults

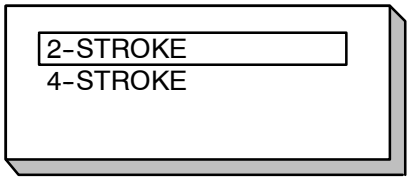


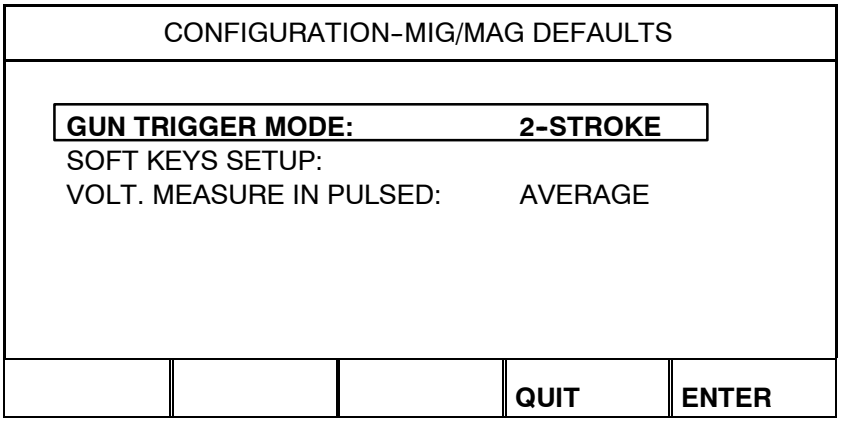
9.2.4.1 Trigger functions

Use the arrow keys to select the line GUN TRIGGER MODE.
Press ENTER to display the list of options.

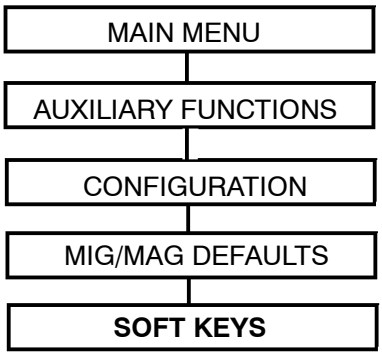


Position the cursor on the line for 2–STROKE in the list and press ENTER. We have now set the GUN TRIGGER MODE = 2–STROKE.





9.2.4.2 Soft key functions



We have already mentioned the five “soft keys“ on the controller. During MIG/MAG welding the user has the opportunity to select the functions of these keys from several options.

Of the five soft keys the three on the left can be assigned a chosen function.

You can choose from the following options:

- Gas purge
- Wire inching
- Trigger mode (2/4)
- Crater fill ON/OFF
- Creep start ON/OFF
- Hot start ON/OFF
- Trigg weld-data switch ON/OFF

A soft key is assigned to one of these functions as follows.

The following appears in the character display. The display has two columns; one for **function** and another for **key number**. The figures 1, 2 and 3 each represent a key, i.e. the key on the far left is number 1, and so on.
In the following example we will assign key number 1 the function CRATER FILL ON/OFF.

Position the cursor on the line CRATER FILL ON/OFF. Press key number 1, i.e. the key on the far left.

ASSOCIATE FUNCTIONS TO SOFT KEYS	
Function	**Soft key**
NONE	1, 2,3
GAS PURGE	
WIRE INCHING	
TRIGGER MODE (2/4)	
CRATERFILL ON/OFF	
CREEPSTART ON/OFF	
HOT START ON/OFF	
TRIGG WELD DATA SWITCH ON/OFF	

NONE	**NONE**	**NONE**	**QUIT**	

The display shows that key number 1 has now been assigned the function CRATER FILL ON/OFF. The number 1 has moved down to the line CRATER FILL ON/OFF and at the bottom of the display you can see the key caption CRATERFILL for the left hand key.

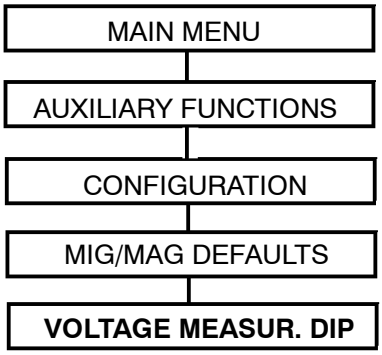
ASSOCIATE FUNCTIONS TO SOFT KEYS	
Function	**Soft key**
NONE	2,3
GAS PURGE	
WIRE INCHING	
TRIGGER MODE (2/4)	
CRATERFILL ON/OFF	**1**
CREEPSTART ON/OFF	
HOT START ON/OFF	
TRIGG WELD DATA SWITCH ON/OFF	

CRATR FILL	**NONE**	**NONE**	**QUIT**	

The other two keys can each be assigned a function in the same way by matching one of the functions in the left column with a key number in the right column.

If you want to assign a new function to a key, move the cursor to the line NONE and press the soft key you want to assign the function to. The display will show the key text NONE, and this can now be reassigned a new function.

9.2.4.3 Voltage measurement for dip



The voltage measurement options for dip welding are as follows:
-average pulse voltage.
-average overall voltage.

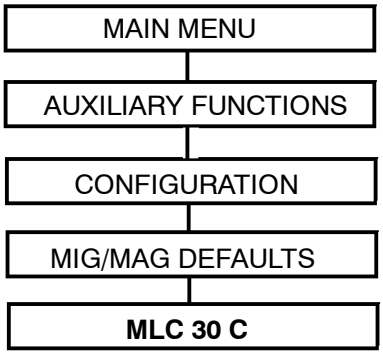
Average pulse voltage
The voltage is only measured during pulses and is filtered before displaying the voltage value.

Average overall voltage
The voltage is measured continuously and is filtered before displaying the voltage value.

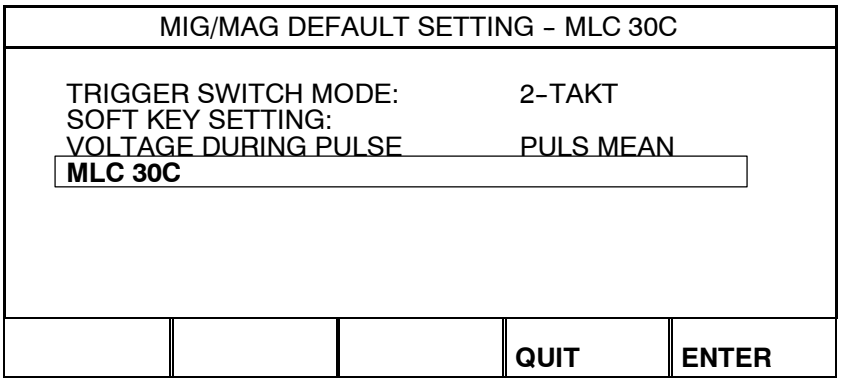
The measured values that are displayed are used as input data for internal and external quality functions.

9.2.5 Wire feed unit MLC 30C

CAUTION!
Upgrade card for MLC 30C is supplied together with the wire feed unit.

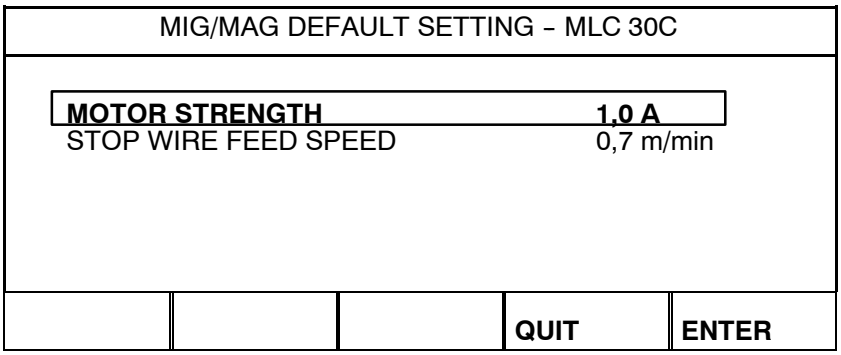


Position the cursor on the line for MLC 30C, press ENTER

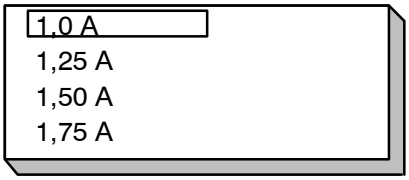


Motor strength
The motor strength is a measure of the torque that the electric push wire feed motor will exert on the wire.
The motor strength is preset to 1.50 A. This torque is suitable for most wires and a range of hose lengths. If you use a soft, thin aluminium wire it may be advisable to reduce the motor strength to 1.25 A to avoid wire feed problems.
If, on the other hand, you are using a 16 m hose with a worn wire liner and wire feeding is sluggish it may be necessary to increase the motor strength to 1.75 A.
Note that it is very important that the rear wire feed unit feeds smoothly, since the power source uses the speed of the rear wire feed unit as a control signal.

Position the cursor over MOTOR STRENGTH. Press ENTER to display a list of options.



Position the cursor on the line for the selected motor strength See the table of wire types and

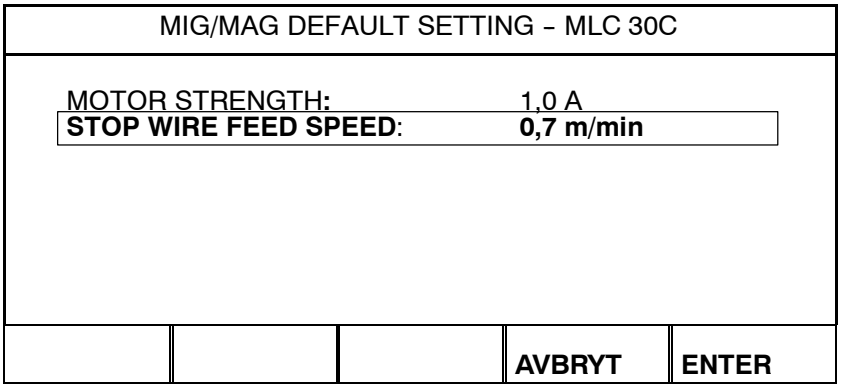


motor strengths in the user manual for MLC 30C.
Press ENTER.

Wire feed speed
The stop wire feed speed is the feed speed at which the power source is switched off. This is to ensure as clean a stop as possible and prevent the wire burning back into the contact tip.
If you are welding at 13 m/min, for example, then the stop speed can be set to 10 m/min, which means that the wire feed unit will stop and the power source will switch off when the wire feed speed drops below 10 m/min.

This reduces the risk of the wire burning back into the contact tip.
If you are welding at 3–4 m/min then the stop speed should be set to a lower value, for example 1.0 m/min.
The range of possible settings is 0.7–10 m/min.

Position the cursor over STOP WIRE FEED SPEED. Use the plus/minus keys to select the desired value. Press ENTER.



9.2.6 MMA defaults

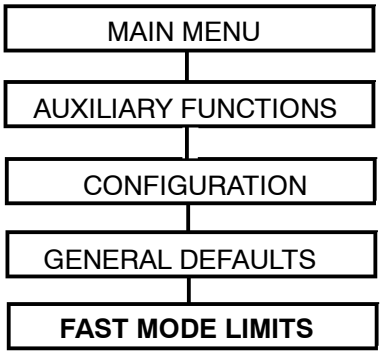
Function intended for future use.

9.2.7 TIG defaults

Function intended for future use.

9.2.8 General defaults

9.2.8.1 Fast set-up limits



To configure a soft key for fast mode, proceed as described below.

Position the cursor on the line for key number.

GENERAL DEFAULTS – FAST MODE				
SOFT KEY NUMBER: 1				
VOLTAGE:	+ 0.0 V – 0.0 V			
WIRE SPEED:	+ 0.0 m/min – 0.0 m/min			
ASSOCIATED WELD DATA: 16 DIP/SPRAY, Fe, aR+20%CO2, 1.2 mm				
			QUIT	

The keys are numbered 1–4 from left to right. Choose the desired key by selecting its number using the plus/minus keys.

Then scroll down with the arrow down key onto the line “ASSOCIATED WELD DATA“. Here you can browse through the sets of weld data that are stored in the weld data memory. Choose the desired weld data number using the plus/minus keys.

When you recall a set of weld data using the fast mode key you still have the option of adjusting the available welding parameters. If you want to restrict the range of adjustment for these parameters you can set uper and lower limits for each parameter.

The following welding parameters can be adjusted:

- for **MIG/MAG**
  - Wire feed speed and
  - Voltage
- for **MMA**
  - Welding current
- for **TIG**
  - Welding current
- for **Arc air gouging**
  - Voltage

To set the limits for parameter adjustment do as follows.

For each parameter you specify a plus value (uper limit) and a minus value (lower limit) using the original weld data setting as a reference point.

Position the cursor on the line for the chosen parameter, e.g. VOLTAGE.

GENERAL DEFAULTS – FASTMODE				
SOFT KEY NUMBER:		1		
VOLTAGE:	#	+	0.0 V	
	*	–	0.0 V	
WIRE SPEED:	#	+	0.0 m/min	
	*	–	0.0 m/min	
ASSOCIATED WELD DATA:		16		
DIP/SPRAY, Fe, aR 20%CO2, 1.2 mm				
			QUIT	

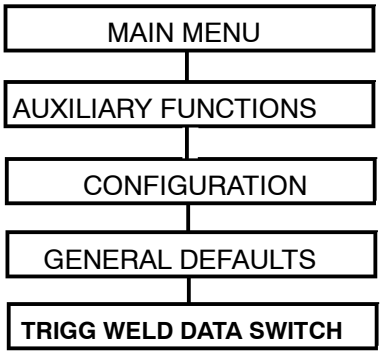
Specify the desired value for the uper and lower limits using the plus/minus keys.

9.2.8.2 Twin start signals

CONFIGURATION – GENERAL DEFAULTS				
FAST MODE LIMITS				
DOUBLE START SOURCES			OFF	
TRIGG WELD DATA SWITCH				
			QUIT	**ENTER**

This option allows you to start the MIG/MAG wire feed unit from the TIG card (universal).
It also enables the TIG torch to be started from the wire feed unit.
This function can be used for mechanised applications.

9.2.8.3 Weld-data shift with pistol



The function WELD-DATA SHIFT WITH PISTOL makes it possible, using the trigger button on the welding pistol, to shift between up to five pre-selected weld-data options.
With a quick squeeze on the welding pistol trigger (quicker than 3/10ths of a second), you can shift to the next weld-data option.

Place the cursor on the row TRIGG WELD-DATA press ENTER.

CONFIGURATION - GENERAL DEFAULTS				
FAST MODE LIMITS				
DOUBLE START SOURCE			OFF	
TRIGG WELD DATA SWITCH				
			QUIT	**ENTER**

Place the cursor on the row TRIGG WELD-DATA press ENTER to get a list of options. Select ON.

TRIGG WELD DATA SWITCH				
TRIGG WELD DATA SWITCH			ON	
ADD/DELETE WELDDATA			1	
SELECTED WELDDATA: 3				
	STORE	**DELETE**	**QUIT**	**ENTER**

Select the weld-data options and shift between them in the following way:

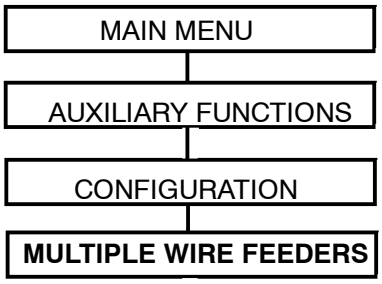
Place the cursor on the row add/remove. Select the memory number under which the weld-data are stored, using the plus/minus buttons and press STORE.

TRIGG WELD DATA SWITCH				
TRIGG WELD DATA SWITCH			ON	
ADD/DELETE WELDDATA			1	
SELECTED WELDDATA: 3				
	STORE	**DELETE**	**QUIT**	

The row SELECTED WELD-DATA displays which weld-data are selected and what content order they have, listed from left to right.

To remove selected weld-data, do as above but press the button REMOVE.

9.2.9 Multiple wire feed units



All new wire feed units are delivered to the customer with the identity number 0. The first thing you need to do is change the ID number (node address) of one of the wire feed units (this only applies to multiple wire feed units).

Move the cursor to the line for multiple wire feed units, press ENTER

AUXILIARY FUNCTIONS – CONFIGURATION				
LANGUAGE: ENGLISH				
LOCK FUNCTION:				
REMOTE CONTROLS				
MIG/MAG DEFAULTS.				
MMA DEFAULTS.				
TIG DEFAULTS.				
GENERAL DEFAULTS				
MULTIPLA WIRE FEEDERS				
UNIT OF LENGTH METRIC				
			QUIT	**ENTER**

Change the ID number as follows:
First connect a new wire feed unit, go to the “MULTIPLE WIRE FEED UNITS“ menu and press the torch trigger to activate the wire feed unit, then read the ID number of the wire feed unit from the top line (should be 0 first time). Now select a new ID number between 0–3.

Move the cursor to the line CHOOSE NEW ID NUMBER. Set the required number between 0–3 by stepping with the plus/minus keys. Press ENTER.

MULTIPLE WIRE FEEDERS				
CURRENT ID NUMBER				
SELECT A NEW ID NUMBER 0				
CONNECTED WIRE FEEDERS ID				
			QUIT	**ENTER**

The ID number on the top line will change to the chosen number.

Now connect the next wire feed unit and press the torch trigger to activate this unit. This wire feed unit will probably have an ID number of 0 as well.

Configuration is now complete and you can start using the equipment as normal.
It is now also possible to configure and run four different wire feed units in the same way.
It does not matter which ID number you assign to each wire feed unit, but it is important that you give each one a different ID number to distinguish between them.

If you accidentally give two wire feed units the same ID number then error message 15 will be displayed continuously.
If this happens you should disconnect one of the wire feed units and repeat the above procedure.
You can always return to the configuration display and check the ID numbers of the connected wire feed units by pressing the torch trigger.

The line CONNECTED WIRE FEED IDs shows the ID numbers of all the wire feed units connected.

9.2.10 Multipla wire feeders

Weld data can be individually assigned to each wire feed unit. To assign data to a wire feed unit it must first be active. When it is active you can recall data as normal (see memory use in section 7) and make any adjustments. These will be assigned to the active wire feed unit.
For the next wire feed unit you again press the torch trigger to make this feed unit active, then recall the data you want to assign to this feed unit.
You can assign any weld data number you want to any wire feed unit you choose.

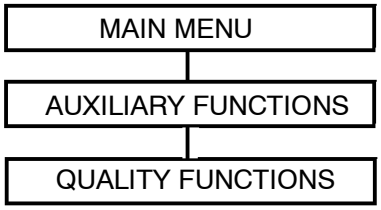
9.2.11 Multipla wire feeders

Remote control units control the wire feed units they are connected to. The digital 5-program remote control recalls data from various memory locations depending on its ID number.
The wire feed unit with ID number 0 recalls weld data from locations 1-5
The wire feed unit with ID number 1 recalls weld data from locations 11-15
The wire feed unit with ID number 2 recalls weld data from locations 21-25
The wire feed unit with ID number 3 recalls weld data from locations 31-35

IMPORTANT

All limits that are set in fast mode and the remote control configuration menu apply to all wire feed units.

9.3 Quality functions



The quality functions keep track of a range of useful data about individual welds. These functions are:

Time of weld start
How long the weld took
Mean, maximum and minimum current for weld
Mean, maximum and minimum voltage for weld
Mean, maximum and minimum power for weld

You can also key in the length of the joint manually and the weld data unit will calculate the heat input.

The number of welds made since the last reset is also displayed. Information on up to 100 different welds can be stored. The weld must take longer than seconds in order to register.

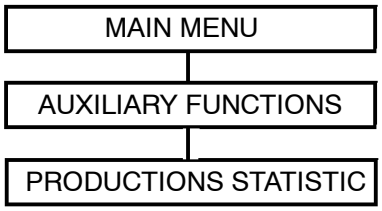
The last recorded weld is shown on the display, but you can also scroll through all the other recorded welds.
When you press RESET, all the variables are zeroed.

QUALITY FUNCTIONS				
WELD 1 START: 01-JUN-97 12:00.02				
WELD TIME: 0.0s				
W LENGTH 0 cm HEAT INPUT 0.0kJ/cm				
	AVE.	MAX	MIN	
I(Amp)	0.00	0.00	0.00	
U(V)	0.00	0.00	0.00	
P(kW)	0.00	0.00	0.00	
NUMBER OF WELDS SINCE LAST RESET: 0				
RESET			**QUIT**	

You can choose a particular weld by scrolling up or down using or to position the cursor on the line that shows the chosen weld.

You can enter the length of the weld in the appropriate field to obtain the heat input in the same way.

9.4 Production statistics



The production statistics keep track of the total arc time, the total mass of wire used and the number of welds made since the last reset. They also record the arc time and the amount of wire used during the last weld. For additional reference the display also tells you what value of mass per length the wire consumption is based on, and when the last restart took place.

The weld count does not increase if the arc time is less than 1 seconds. For this reason the wire consumption is not displayed for welds this short. However, the wire consumption and time for such welds are both included in the total figures for wire consumption and arc time.

When you press RESET, all the counters are reset to zero and the last reset display shows the current date and time.

PRODUCTION STATISTICS

	LAST WELD	TOTAL
ARCTIME	181 min 24s	0s
CONSUMED WIRE	0g	0g
BASED ON	0.09g/m	
NUMBER OF WELD		0
LAST RESET	01-JUN-97	12:00.02

RESET			**QUIT**	

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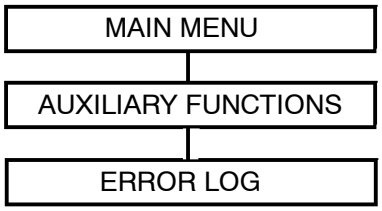
9.5 Error log



All faults that occur while the welding equipment is in use are recorded as error messages in the error log. Up to 99 error messages can be stored. If the error log becomes full, i.e. if 99 error messages have been saved, then the oldest error message is automatically deleted when the next fault occurs.

12 ▶ Date	Time	Unit	Error
970422	15:52,24	CBOX	18
Lost contact with wire feeder			
970422	16:54.04	CBOX	12
Lost contact with power source			
970423	09:14,33	PSOURCE	6
High temperature			

DELETE	**DELETE ALL**	**VIEW TOTAL**	**QUIT**	

9.5.1 Deleting error messages

If you want to delete error messages there are two options, each with their own key.

- Delete **marked** messages
- Delete **all** messages

9.5.2 Reviewing errors

By pressing the VIEW TOTAL key you can view all the recorded error messages in the error log. You can also see the date and time of the most recent recorded error message.

ERROR LOG – TOTAL LISTING				
TOTAL ERROR MESSAGES: 12				
OLDEST ERROR: 970417, 11:09,11				
LATEST ERROR: 970429, 13:04,45				
			QUIT	

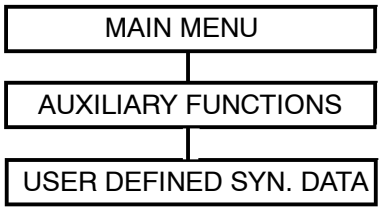
9.5.3 Error messages

This is a list of the error messages that may appear.

1	CBOX PSOURCE WFEED	**Checksum control failed in EPROM:**Program memory error - Test only carried out on start-up when power is switched on. This error does not override any functions.
2	CBOX PSOURCE WFEED	**RAM test failed in microprocessor:**Error in microprocessor's internal RAM - Test only carried out on start-up when power is switched on. This error does not override any functions.
3	CBOX	**Failed external RAM test:**Test only carried out on start-up when power is switched on. This error does not override any functions.
4	CBOX PSOURCE WFEED	**Drop down in 5V supply line**:Computer supply voltage has dropped for some reason. May occur if machine is switched off, but may also be due to fault in voltage supply to card.
5	PSOURCE	**DC voltage outside limit:**DC voltage from rectifier is either too high or too low, possibly as a result of mains voltage spikes or low mains voltage. The inverter is automatically shut down immediately and power is only restored when the voltage drops below the limit.
6	PSOURCE	**High temperature:**The temperature of the welding power source is too high, possibly as a result of overloading, a defective cooling fan or some other component fault.
7	PSOURCE	**High primary current:**The inverter is drawing too much current from the rectifier that supplies it. The inverter is automatically shut down immediately and power is only restored when the problem has been corrected.
8	CBOX PSOURCE WFEED	**DC voltage 1 outside safe limits:**CBOX: Battery voltage is too low. PSOURCE: The internal +15VC supply is either too high or too low. WFEED: The internal +15V supply is either too high or too low.
9	PSOURCE WFEED	**DC voltage 2 outside safe limits:**PSOURCE: The internal +15V supply is either too high or too low. WFEED: The internal +20V supply is either too high or too low.
10	PSOURCE	**DC voltage 3 outside safe limits** The internal +15VB supply is either too high or too low.
11	PSOURCE WFEED	**Servo error:** PSOURCE: The current servo cannot supply the current demanded by the microprocessor. There is a persistent difference between the shunt response and the set current. WFEDD: The wire feed servo is unable to provide the wire feed speed demanded by the microprocessor.
12	CBOX PSOURCE WFEED	**Warning state in bus interface:** The bus circuit error count has reached a value that triggers the error message. If the error count continues to rise the bus circuit is switched to the "bus-off" state and contact with the weld data unit (controller) is broken.
14	CBOX	**Bus off state - communication breakdown:** The bus circuit error count has reached a value that switches it to the "bus-off" state. The power must be turned off and on again to reset.
15	CBOX PSOURCE WFEED	**Message lost in bus communication:** The bus circuit detects that a message has been lost because a later message has been written over it.This error does not override any fun.
17	CBOX	**Lost contact with wire feeder:** An identification message is used to keep an ongoing check that a certain unit is still in the network. This message appears if there is no response within the "Time out". The stop command is immediately sent to the power source.
18	CBOX	**Lost contact with power source:** An identification message is used to keep an ongoing check that a certain unit is still in the network. This message appears if there is no response within the "Time out". The stop command is immediately sent to the wire feeder.

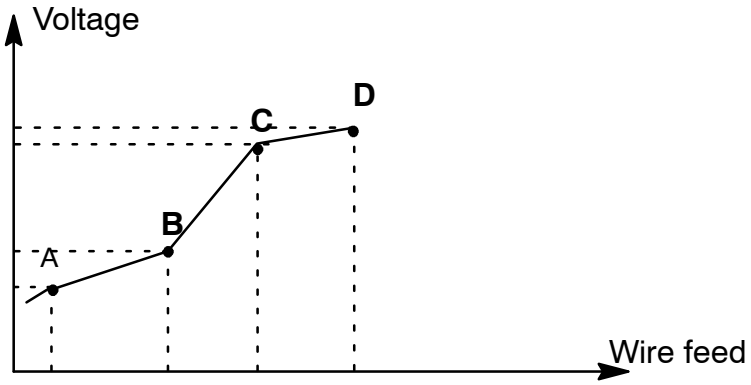
19	CBOX	**Failed integrity control in RAM:** One byte in the battery-powered RAM memory is used for random checking. If the battery voltage is lost, this value will not match when the test is carried out at the next start-up, and the weld data memory will be reset. The reset process means that all weld data settings return to their default settings, which are: MIG/MAG, DIP/SPRAY, Fe, CO2, 1,2 mm.
20	CBOX	**Unaccepted settings stored in RAM:** An illegal value has been detected among the non-numerical setting parameters. The weld data memory is reset when this error occurs. This test is only carried out during start-up, after the power is switched on. This error does not override any functions.
21	CBOX	**Incompatible settings stored in RAM:** An illegal combination of values for method, material, gas and wire have been entered. The weld data memory is reset when this error occurs. This error does not override any functions.
22	CBOX	**Overflow in transmit buffer:** The transmit buffer memory is full. An interruption in the bus circuit can cause this error. The power must be switched on and off again to reset.
23	CBOX	**Overflow in receive buffer:** The receive buffer memory is full. This error occurs when the microprocessor in the controller is overloaded as a result of receiving more messages than it can handle. The power must be turned off and on again to reset it.
25	CBOX	**Incompatible weld data format:** When welding data is input into the controller (not individual data but block transfer of weld data) it includes a version number for the weld data format. If this version number does not match the version used by the controller then it sends this error code.
26	PSOURCE WFEED	**Watchdog reset triggered:** The processor's internal watchdog has been triggered, i.e. something has prevented the processor from carrying out its normal duties in the program main loop within the given time limit (64 ms). When this happens the processor is reset and starts again. When the program restarts it detects that the restart was caused by the watchdog, and sends this message. This error does not override any functions.
27	WFEED	**No welding wire:** The wire feed unit has run out of welding wire.
28	CBOX PSOURCE WFEED	**Stack overflow:** The stack (the part of the memory the processor uses to store data temporarily) has overflowed. This fault can occur if the processor has an excessive work load.
29	PSOURCE	**No water flow:** The water flow monitor has detected that there is no water flow.
30	CBOX	**Lost contact with TIG I/O unit:** An identification message is used to keep an ongoing check that a certain unit is still in the network. This message appears if there is no response within the "Time out". The stop command is immediately sent to the power source.
31	CBOX	**No response from display unit:** The processor does not get any response from the display unit (normally the display unit confirms all commands from the processor). This error does not override any functions, apart from the display itself, which may stop working.
32	WFEED	**No gas flow:** The gas flow monitor has detected that there is no gas flow.

9.6 User-defined synergic lines for MIG/MAG



It is possible to create user-defined synergic lines that relate the wire feed speed to the voltage. A maximum of ten such synergic lines can be saved.
Creating a new synergic line is done in two stages.

1. Define the new synergic line by specifying a number of voltage-wire feed speed coordinates, see steps A-D in the following diagram.



2. Specify which wire-gas combination the new synergic line will apply to.

9.6.1 Specify feed speed-voltage coordinates

To create a new synergic line for dip/spray welding you need four coordinates, while for pulse welding you need two coordinates. These coordinates must then be saved under special weld data numbers in the weld data memory.

Do as follows:

1. Call up the main menu and choose the MIG/MAG method (dip/spray or pulse) that you intend to use with the new synergic line.
2. Key in the desired values of voltage and wire feed speed for the first coordinate.
3. Call up the memory menu and save the first coordinate as weld data number 96.
   - The four coordinates for a dip/spray synergic line must be saved as numbers 96, 97, 98 and 99.
     In addition:
     - each weld data number must contain higher values of voltage and wire feed speed than the weld data number that precedes it.
     - the parameters inductance, regulatortype and hot start voltage must have the **same values** in all four weld data numbers.
   - The two coordinates for a pulse welding line must be saved as numbers 96 and 97. In addition:

- the higher weld data number must contain higher values of voltage, wire feed speed, pulse frequency, pulse amplitude and background current than the weld data number that precedes it.
- the parameters pulse time, hot start voltage, Ka, Ki and the Slope parameters must have the **same values** in both weld data numbers.

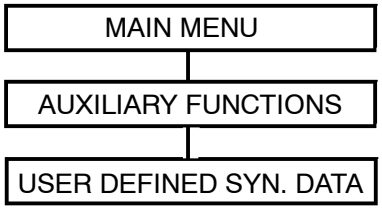
- Crater fill data must be saved as weld data number 96 (for both methods, dip/spray and pulse)

4. Define the number of coordinates that are needed, then move on to “Specifying the relevant wire-gas combination“.

9.6.2 Specifying the relevant gas-wire combination

Do as follows:

1. Set up the display to handle user-defined synergic lines.



Position the cursor on the line WIRE TYPE and press ENTER.

MAKE CUSTOMISED SYNERGIC LINES				
WIRE TYPE: Fe SHIELDING GAS: Ar+20%CO2 WIRE DIMENSION: 1.2 mm STORE NEW LINE FROM WELD DATA MEMORY 96, 97, 98, 99 DELETE SYNERGIC LINE				
			QUIT	**ENTER**

Choose an option from the list displayed (mark the option and press ENTER).

2. Now choose a shielding gas and the wire diameter in the same way.
3. Mark the line STORE NEW LINE.... and press ENTER.

The process is now complete - a new synergic line has been defined.

NOTE!

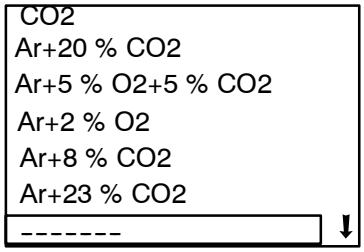
If you want to use the crater fill function when pulse welding then there must be a corresponding synergic line for dip/spray welding since all crater fill data is based on dip/spray parameters.

When you create a new synergic line for pulse welding you will therefore always be warned if a corresponding line has not been created for dip/spray welding.

WARNING!
No corresponding synergic line
for dip/spray welding

9.6.3 Creating user-defined wire/gas options.

The list of wire and gas options can be extended to include up to 10 user-defined options. At the bottom of each list is an empty line (---). By placing the cursor on this line and pressing ENTER you gain access to a “keyboard“ that allows you to type in your own options.



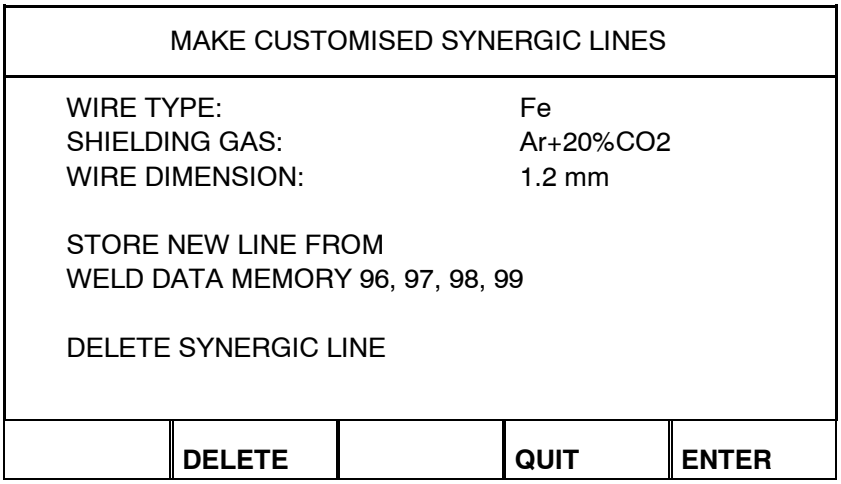
The controller “keyboard“ is used as follows:

- Position the cursor over the chosen keyboard character using the arrow keys. Press the soft key “PRESS KEY“.
  Type in a string of text of up to 20 characters in this way.
- Mark the “keyboard’s“ ENTER key (↲) and press the soft key “PRESS KEY“, and the name of your user-defined option will appear in the list.

Deleting a user-defined gas/wire option:

Mark the user-defined wire or gas option in the current list.

Press the DELETE key



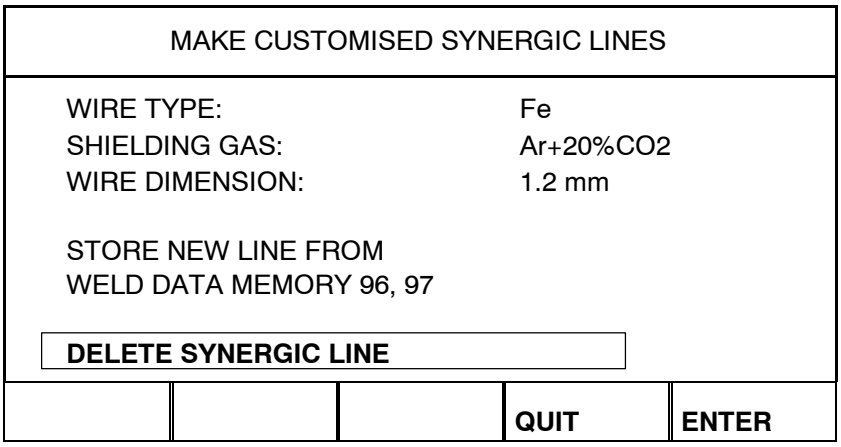
A user-defined wire or gas option **cannot be deleted** if it forms part of a set of weld data that is currently in the working memory.

9.6.4 Deleting a user-defined synergic line

A user-defined synergic line can be deleted if it is not active, i.e. if it is not part of a set of weld data that is currently in the working memory.

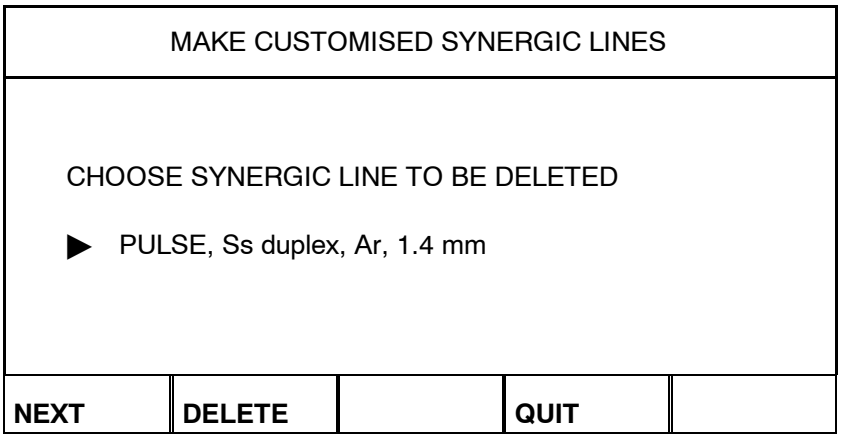
Position the cursor on the line DELETE SYNERGIC LINE.

Press ENTER.



The display will change. By using the NEXT key you can scroll through the user-defined synergic lines that have been saved.

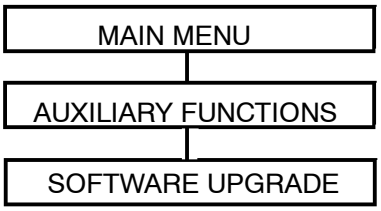
Scroll to the line you want to delete and press the DELETE key.



9.7 Serial communication

Function intended for future use.

9.8 Program Upgrades



Application area

With this function, you can use a PC card to upgrade software for the controller, the current source and the measurement unit.

SOFTWARE UPGRADE				
Unit		Curr..ver	PC-card	
SYSTEM VERSION			1.00B	
BOOT SOFTWARE			1.12	
☐ POWER SOURCE		1.50A	1.50B	
☐ WIRE FEED UNIT		2.00A	2.00A	
☐ WELD DATA UNIT		1.31E	1.31F	
			QUIT	**UPGRADE NOW**

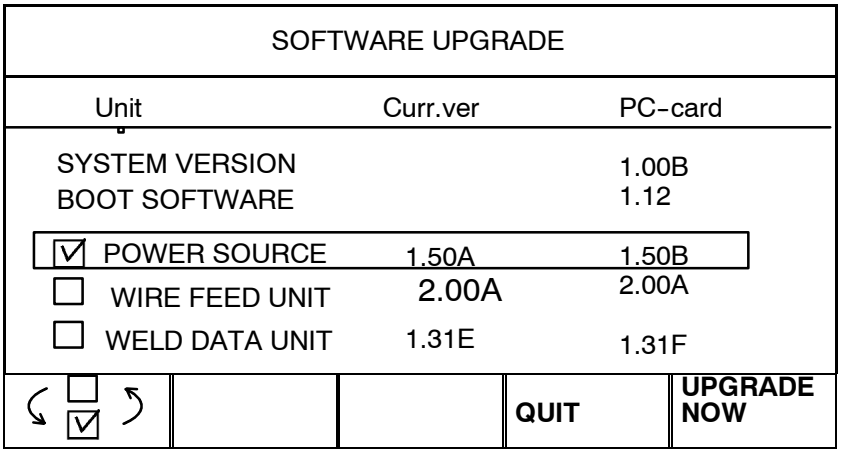
Current version	Specifies the active program version for this unit.
PC card	Specifies the program version stored on the PC card for this unit.
?	There is a unit but the computer is unable to determine its version number.
-	There is no program for this unit on the PC card.
System version	Specifies the software set-up stored on the PC card. A software set-up can consist of 1…4 programs (one for each unit).
Boot program	Program for upgrade management.
Current source	Circuit board for control of weld current.
Wire feed unit	Circuit board for control of wire feed.
Weld data unit	Circuit board in the controller.

GB

How to upgrade:

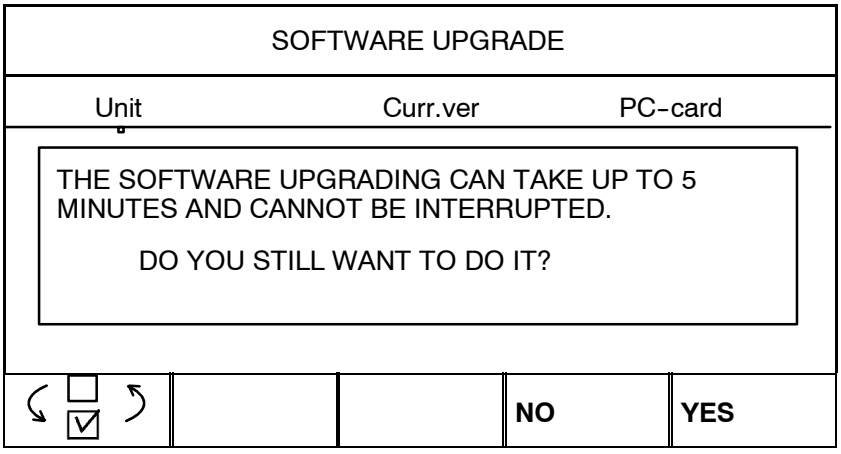
Choose the unit (or units) that need to be upgraded by placing the cursor on the appropriate line and marking (☑) them. After making your selection, press EXECUTE UPGRADE and confirm with YES to start the upgrade.

Place the cursor on the line for the unit to be upgraded.

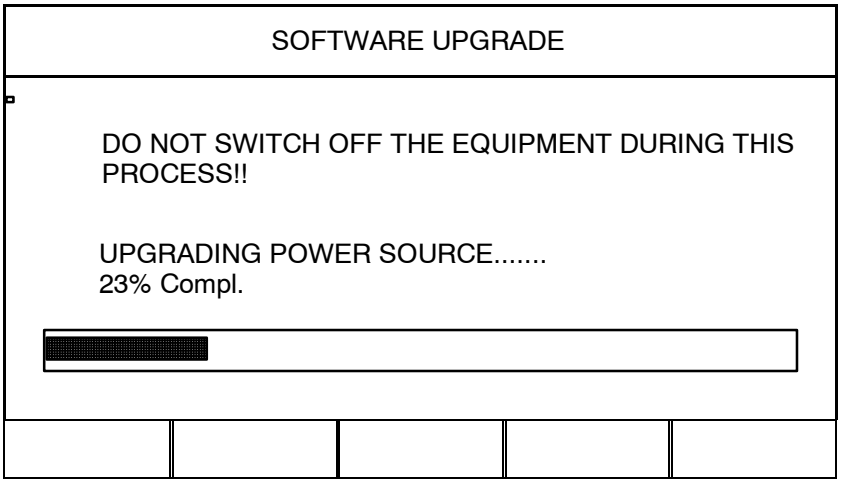


- Press the first button to select the unit (a checkmark will appear).
  You can cancel your selection by pressing the button again (the checkmark will disappear). If more than one unit is to be upgraded, select them in the same way.

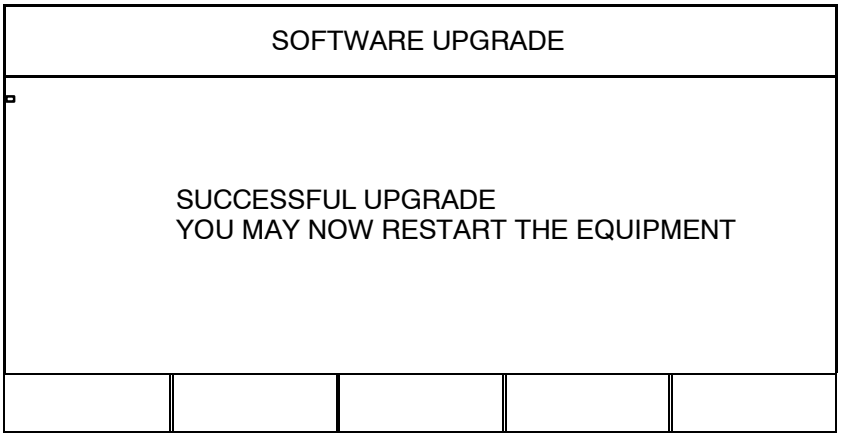
Press YES to upgrade. Upgrading can take up to five minutes.



The following dialogue box is shown in the display window while the upgrade is in progress.



When the upgrade is complete, the following is shown in the display window.



All selected units have now been upgraded.
To use the welding equipment, restart the current source.

- Turn the switch for line voltage on the current source to the 0-position.
- Turn the switch for line voltage to the 1-position.

***WARNING*! Be sure that the current source□s line voltage is not disconnected during an upgrade. If this happens at an early stage during the upgrade, you will need to contact ESAB's service technicians.**

10 APPENDIX

10.1 Setting ranges and setting steps

MIG/MAG

Parameter	Setting range	Setting steps
Wire feed speed	1.5–25.0 m/min	0.1 m/min
Voltage	8.0–60.0 V	0.25 V
Inductance	0–100 %	1 %
Pulse current	100–600 A	4 A
Pulse time	1,7 – 25,5 ms	0.1 ms
Pulse frequency	20 – 312 Hz	2 Hz
Background current	12–300 A	4 A
Slope time	1–9	1
Ka	0–100 %	1 %
Ki	0–100 %	1 %
Gas pre-flow time	0.0–25.0 s	0.1 s
Gas post-flow time	0.0–25.0 s	0.1 s
Burnback time	0.00–1.00 s	0.01 s
Hot start time	0.0–10.0 s	0.1 s
Wire feed speed, Hot start	0.0–20.0 m/min	0.1 m/min
Voltage increase, Hot start	0.0–60.0 V	0.25 V
Crate fill time	0.0–10.0 s	0.1 s
Final wire feed speed, Crater fill	1.5–25.0 m/min	0.1 m/min
Final voltage, Crater fill	8.0–60.0 V	0.25 V
Shake-off pulse	10–120 %	1 %
Regulator type	Type number 1–12	–

The parameters in italics are not available in synergic mode.

The parameter **control type** does not have a true setting range. In MIG/MAG welding you can choose from twelve different control types numbered 1–12.

MMA

Parameter	Setting range	Setting step
Welding current	16–320 A (Aristo 320) 16–450 A (Aristo 450)	1 A 1 A
Arc force	0–100 %	1 %

The parameters in italics are not available in synergic mode.

TIG

Parameter	Setting range	Setting step
Current, Pulse current, Background current	4–320 A (Aristo 320) 4–450 A (Aristo 450)	4 A 4 A
Pulse time	0.001–5.000 s	0.001 s
Background time	0.001–5.000 s	0.001 s
Slope-up time	0.0–25.0 s	0.1 s
Slope-down time	0.0–25.0 s	0.1 s
Gas pre-flow time	0.0–25.0 s	0.1 s
Gas post-flow time	0.0–25.0 s	0.1 s

Arc air gouging

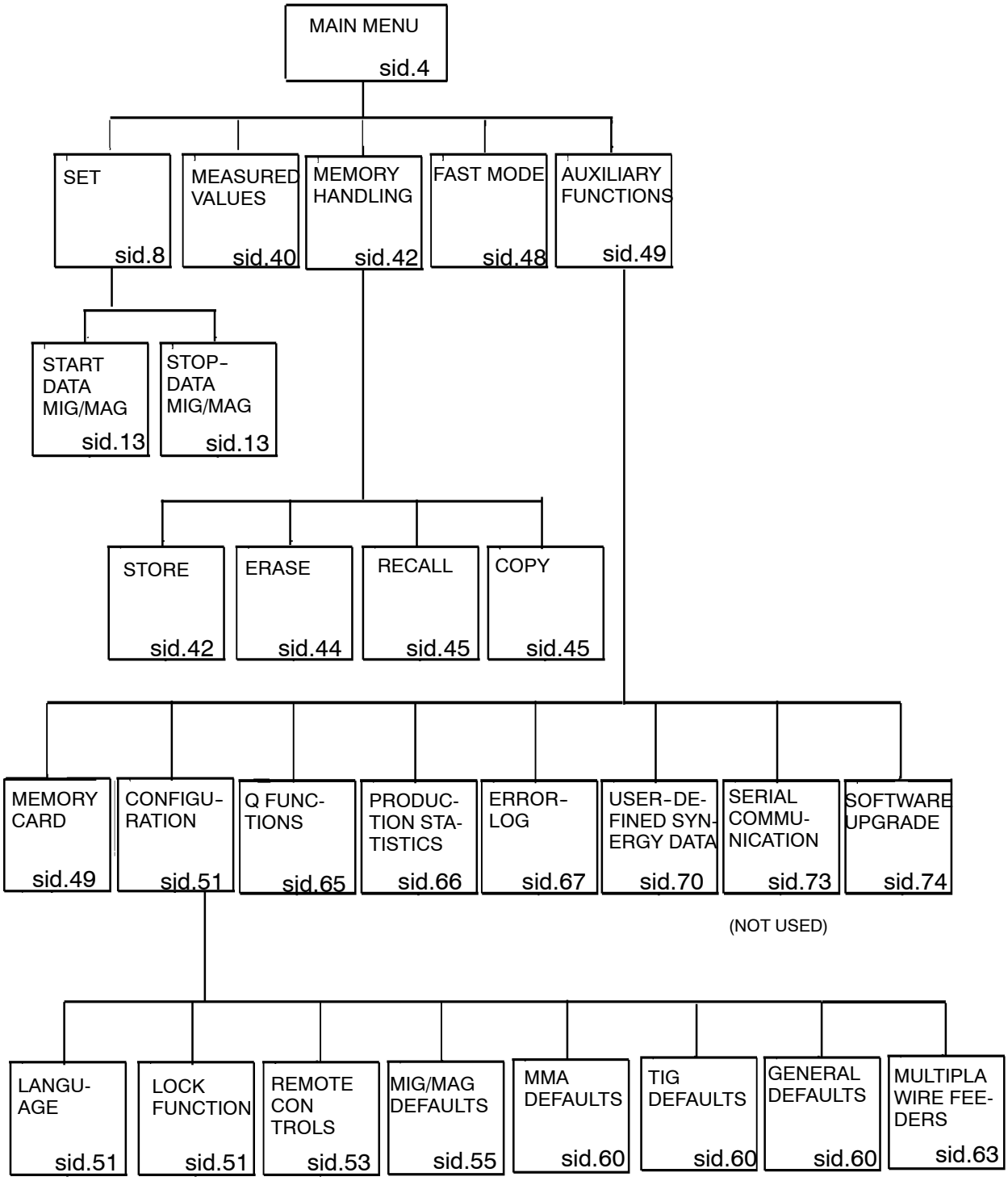
Parameter	Setting range	Setting step
Voltage	8.0–60.0 V	0.25 V
Inductance	0–100 %	1 %
Control type	Type number 1, 2, 5	–

The parameters in italics are not available in sudowngic mode.

The parameter **control type** does not have a true setting range. In arc air gouging you can choose from three different control types numbered 1, 2 and 5.

GB

10.2 Menu structure



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